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Stress & Well-Being in the Workplace: A Longitudinal Cross-Lagged Structural Equation Modeling Investigation

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ABSTRACT

The current research expands upon previous knowledge by further investigating the causal relationship between self-ratings of occupational stress, psychological well-being, personal control and work performance. The work has also been designed to address the methodological pitfalls and deficiencies apparent in longitudinal research by incorporating the methodological and statistical rigor of structural equation modeling (SEM). A review of the occupational health literature indicates a broad range of inconsistencies regarding the causal pathways between variables. Based upon these inconsistencies, the aims of this research are to address three main hypotheses: the relationship between stress and well-being (H1), the relationship between stress, control and well-being (H2) and the association between stress, work performance and well-being (H3). All three hypotheses measure variables across work, non-work and context-free domains. Three samples of data were incorporated within the study in order to cross-validate findings. SEM techniques were conducted to analyse data to examine the intricate one-way, reverse and reciprocal relationship between variables.

In relation to H1, results support a best fitting reciprocal cross-lagged model where both sources of stress and psychological well-being simultaneously influence one another across work, non-work and context-free life domains. A good fitting reciprocal cross-lagged model revealing that sources of stress and control across domains simultaneously effect each other was also produced in regards to H2. In relation to H3, again findings support a best fitting reciprocal cross-lagged model where both sources of work/non-work stress and work performance simultaneously effect one another.

Overall the results theoretically build upon previous work conducted by further emphasising the complex causal relationship between organizational health factors including one-way, reverse and reciprocal associations. This research suggests that stress and well-being models should not be designed in the future without considering the strong causal influence of factors outside of work. This study also addresses all seven longitudinal methodological and statistical recommendations put forward by Zapf, Dormann & Frese (1996). The practical implications of the current study and recommendations for future research are also put forward.

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Considerable thanks to my supervisor and Director of Studies, Professor Andrew Guppy, for his valued time, advice and who has made the process of this research both an enjoyable and productive experience. Further thanks to my other two supervisors, Dr Tracey Cockerton and Dr David Jarrett, for their guidance and assistance with this projects statistical analysis.

DECLARATION

I declare that the research contained within this thesis is entirely my own work.

Signed: ....

Julian Edwards

The views expressed in this thesis are those of the author and not of the University

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<u>SECTION A:</u> INTRODUCTION/LITERATURE REVIEW

SECTION A consists of five chapters that review the literature in relation to the variables incorporated within the current research. The review of the stress and well-being models presented within Chapter One is the most in-depth discussion of issues as this reflects the main purpose of the study. Chapter Two discusses theories and models of control and the mediating role it plays within the stress/well-being process. This is followed by a discussion of the influence of individual differences within occupational stress research. Theories and models of work performance and the interrelationship it has with other variables within this study are then put forward. SECTION A concludes with a chapter that summarises the contents of chapters 1-4 and outlines the purpose, methodology and aims of the current research (Chapter Fiv3). Chapters 1-3 all contain similar sub-sections in order to give SECTION A a structured format i.e. overview of the chapter, theories and models, evaluation, criticisms and a summary.

CHAPTER ONE: REVIEW OF THE THEORETICAL STRESS AND WELL-BEING MODELS

1.1 Overview of Chapter One

Chapter One begins with a summary of the problems associated with occupational stress. This is followed by a theoretical review of the historical background surrounding the development of stress models, such as the stimulus-based, response-based and transactional models of stress. Two principal models are then discussed in detail: Cooper's (1986) model of work stress and Warr's (1987) model of affective well-being.

Both models are initially given a description, followed by a thorough evaluation discussing evidence for and against the models and criticisms discussing further outstanding concerns within each model. A brief review of research undertaken, measuring the relationship between stress and well-being, which are specific to university staff, working/non-working students and trainee nurses samples shall be explored. Finally, a summary of the content within Chapter One will be outlined.

1.2 Extent of the Problem

Over the past four decades significant alterations have occurred within the workplace where the increase in information technology, the globalisation of many industries, company restructuring and changes in job contracts and workplace patterns have all contributed to the transformation of the nature of work (Sparks, Faragher & Cooper, 2001). In recent years, stress and well-being within the workplace have become an increased problem for both employee and employer world-wide (Dollard & Metzer, 1999). Stress at work appears to be a growing problem. Speilberger & Reheider (1994) indicated within their U.S. national survey that employee's who experiences high levels of stress had more than doubled between 1985 and 1990. Thus, workplace stress in now considered one of the top five job-related health problems in the U.S (Kinman, 1996). A similar study conducted in the U.K by the Policy Studies Institute (1993) found that nearly one-third of workers who participated experienced high levels of stress and more than half considered that their stress levels over the last five years had increased. Further, a study by the Health & Safety Executive showed in a survey that approximately 20% of the workers in a random British working population announced very high levels of stress at work and approximately 43% reveal their work to be moderately stressful (HSE, 2000, Smith, Johal, Wadsworth, Davey Smith & Peters).

The Health & Safety Executive (1990) undertook a study of U.K workers measuring disability or physical problems that was caused by or made worse by work. Findings show that stress and depression were among the greatest number of conditions. Cooper & Davidson (1982) found similar results in a sample of U.K managers. Seventy-one percent of respondents reported that their psychological health problems were associated with workplace stress. MIND, the mental health charity, suggest that 30-40% of sickness absence from work is related to mental or emotional disturbance (cited in Earnshaw & Cooper, 1994). Boyd (1997) more recently conducted a survey in collaboration with International Communications Research, American Society of Chartered Life Underwriters & Chartered Financial Consultants and the Ethics Officer Association. Results show that 56% of employees reported experiencing immense pressure at work. Moreover, 88% of respondents reported physical reactions resulting from their pressure with depression amongst the most frequent symptoms. As a result of the ever changing work environment and its affect upon employees and employers, many organizations are dramatically transforming their structures and strategies in response to commercial pressures of the last ten years (Kinman, 1998).

It has been well known for many years that occupational stress is costing the U.K economy a massive human resource bill (Cooper & Payne, 1988). The Confederation of British Industry (CBI) revealed that 360 million working days are lost each year in the

U.K through sickness at a cost of £8 billion to organizations (Sigman, 1992). The Health & Safety Executive estimate that at least 50% of these lost days are associated with stress absence. Similarly, the CBI state that 80 million lost working days within the U.K are the result of mental illness at a cost of £3.1 billion to the U.K industry (Cooper & Cartwright, 1996). Within the U.S, Karesek & Theorell (1990) revealed that the cost of occupational stress to organizations is as much as $150 billion per annum.

Dollard & Metzer (1999) sum up "The accumulation of research findings now suggest a significant work stress problem, with implications for worker health, motivation and productivity, that warrants a concerted applied research effort at a local level and a strategy and policy response at a national level."

1.3 Historical Background of the Theoretical Stress Models

Cannon (1914) initially introduced the concept of the relationship between emotion (psychological well-being) and physiological threat (stress). Cannon suggested a flight-fight syndrome, flight representing a fearful response to an environmental threat and fight representing an aggressive response to an environmental threat (Cox, 1978). Thus, Cannon's theory is based upon emotional reactions in terms of physiological changes in response to intense threat or stress in an attempt to maintain an internal balance or homeostasis. However, according to Cox (1978), Cannon's theory concentrates primarily on physiological responses with limited attention to psychological influences.

Over the past 50-60 years, it has been concluded in several different reviews of the stress literature that there are essentially three different, but overlapping, approaches to the definition and study of stress (Lazarus, 1966; Appley & Trumbell, 1967; Cox, 1978, 1990; Cox & Mackay, 1981 and Fletcher, 1988, cited in Cox, 1993). These three approaches are the engineering (stimulus-based), physiological (response-based) and psychological (transactional) approaches. The following three subsections shall discuss these three dominant theories of stress respectively.

1.3.1 Stimulus-Based Models of Stress

Stimulus-based definitions conceptualise stress as an aversive element of the environment which acts upon the individual (Cox, 1978). This engineering approach suggests that adverse stimuli produce symptoms of stress within the otherwise passive individual. The engineering definition perhaps derives from the way the term is used to represent external forces or load that exert pressure on an individual and thus producing strain. Similar in the way that a tiny amount of external force can cause an iron bar to suddenly bend (Wilson, 2000). Consequently, the result of such symptoms can have an adverse effect upon an individuals well-being (Cox, 1993).

The stimulus-based models were developed by Symonds (1947) in relation to the selection of British RAF personnel "...stress is that which happens to the man, not that which happens in him; it is a set of causes not a set of symptoms.". Thus, engineering models indicate that stress experienced by an individual is measured purely via external environmental stimuli.

However, stimulus-based models appear to be too mechanistic in their approach to stress in that the individual is considered "the passive recipient of stress" (Cox & Mackay, 1981). The main criticism of the models is that they do not account for the influence of mediating psychological factors such as cognitive behaviours and individual differences in response to stressful events (Lazarus & Folkman, 1984). The models presume that sources of stress have the same effect upon different individuals (Cox, 1993 and Brough, 1997). The stimulus-based models of stress are now commonly discredited and have been replaced by models that account for the influence of mediating variables and individual differences to explain an individuals response to stress (Lazarus, 1966 and Cox, 1993).

1.3.2 Response-Based Models of Stress

Response-based definitions of stress focus on the physiological outcomes of the stressful situation (i.e. stress is seen as a response to disturbing stimuli). Selye (1956) proposed that the physiological response to a stressful experience was triphasic in nature (alarm, resistance and exhaustion). This model was is referred to as the General Adaptation Syndrome (GAS) model and its purpose is to maintain physiological homeostasis through the adaptation to adverse (stressful) environmental stimuli.

The alarm stage represents the individual's initial shock reaction of the stressor upon the body, characterised by changes in physiological respiration rates. This is followed by countershock, where the individuals defence mechanism becomes active. The resistance stage represents the phase of greatest adaptation in response to the stressor, where successful return to physiological homeostasis for the individual is aspired. According to Selye, if adaptation is successful, the individual becomes resilient to the stressor and the symptoms encountered during the alarm stage will improve or disappear. However, if adaptation is unsuccessful, individual physiological vulnerability to the stressor increases. The exhaustion stage represents the failure of reaction and adaptation to the continuing stressor. Consequently, the individual is no longer able to adapt to the continued stress/stimuli and this leads to physiological disorders such as exhaustion and ultimately death. Thus, Selye (1956) proposed that physiological reactions to stress are specific in that they follow a fixed sequence of responses (i.e. alarm, resistance and exhaustion).

Criticisms of the response-based theories of stress note the models inability to consider the important differences in patterns of responses across individuals and stressors (i.e. the models non-specific/generalisation of physiological responses via the triphasic sequence of reactions to stressors, Cox, 1993). Further criticisms of the model relate to the direct focus of physiological responses to stress without the consideration of psychological influences such as cognitive processes and individual differences (Lazarus, 1966, and Cox, 1993).

It would appear that both the stimulus and response based models of stress are conceptually dated in that they reside within a basic stimulus-response paradigm. Both models seem to simplistically refer to the individual as a passive vehicle in the stress process (Cox, 1993 and Brough, 1997). However, the influence of psychological factors within individuals' reaction to stressful stimuli has become the focus of attention within present day transactional models of stress.

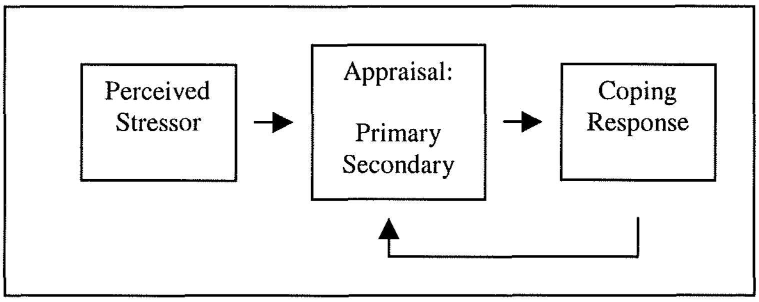
1.3.3 Transactional Models of Stress

Psychological approaches to stress were developed in an effort to overcome the criticisms of the engineering and physiological approaches (Cox, 1993). This approach basically subsumes two similar models, the interactional and transactional models. Cox (1993) states that interactional models focus on the structural characteristics of an individual's interaction with their environment and is represented by the Person-Environment Fit theory (French, Caplon & Van Harrison, 1982) and the Job/Demands Job Decision Latitude theory (Karesek, 1979), whereas transactional models focus on "the psychological mechanisms underpinning that interaction" and is represented by theories by Lazarus (1966) and Cox (1978). Thus, transactional models represent an expansion of the interactional models and are mainly consistent with them.

Fundamentally, within transactional models of stress, the individual's interaction with internal and external stimuli is considered to generate and mediate the stress experience. Models consider the stress state as a continuos, adaptive process. Stress is considered the internal representative of particular and difficult transactions between individuals and their environment (Cox, 1993).

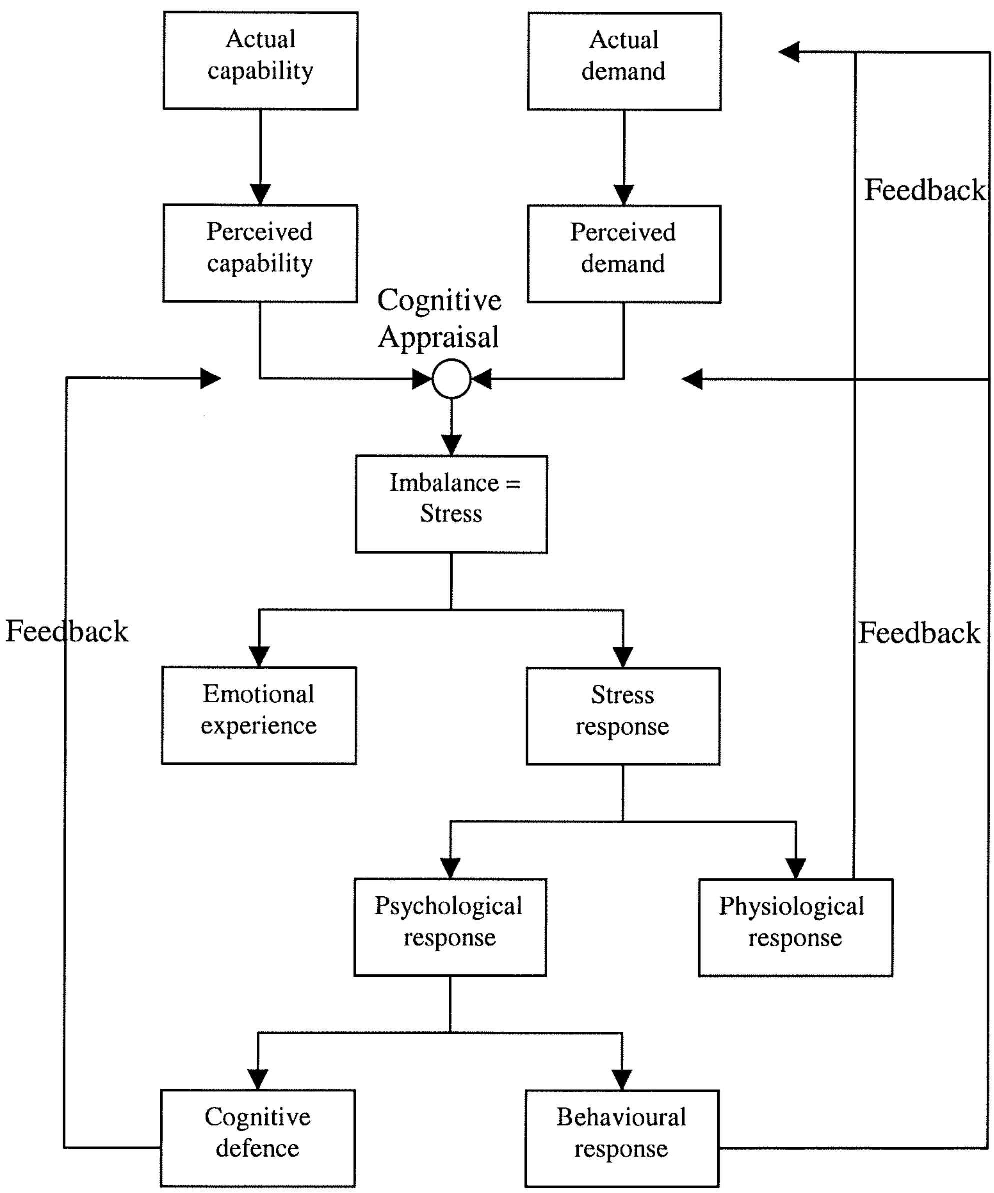
Lazarus (1966) developed a transactional model of stress that emphasised that stress is encountered when environmental demands are considered by the individual to go beyond their capabilities. The model considers that an individual's response to stress depends on the result of a process comprising perception and cognitive appraisal of the stimuli. The model was termed the person-environment fit and suggests that a sense of well-being is best fulfilled when a person's individual characteristics are in balance with the demands of the environment. According to Lazarus (1981), psychological stressors depend on both the person and situation and result from the adaptational association via the appraisal of the person. Figure 1.1 shows a simplistic diagram of Lazarus's (1966) model of stress. (Appraisal is discussed in its own right in more detail within Chapter Four).

Figure 1.1: Lazarus's (1966) Transactional Model of Stress



Cox and Mackay (1976) also proposed a transactional approach to stress similar to Lazarus's model (1966) emphasising an on-going two-way interrelationship between person and environment. Cox suggested a five stage model (See Figure 1.2). Stage one represents a source of internal and/or external demands from the person's environment. Stage two represents individuals' perception of these demands via cognitive appraisal in regards to their ability to cope. Cox distinguishes here between perceived demands and capabilities as opposed to the actual demands and capabilities. During stage three the individual experiences a state of stress which is the result of an in-balance between perceived demands and perceived abilities. The fourth stage represents the consequences of coping attempts to lesson stress. The fifth and final stage represents a feedback process whereby any remaining imbalance between demands and capabilities resulting in stress are identified throughout the four prior stages. (The coping process is also discussed in detail within chapter Two).

Figure 1.2: Cox's (1978) Transactional Model of Stress



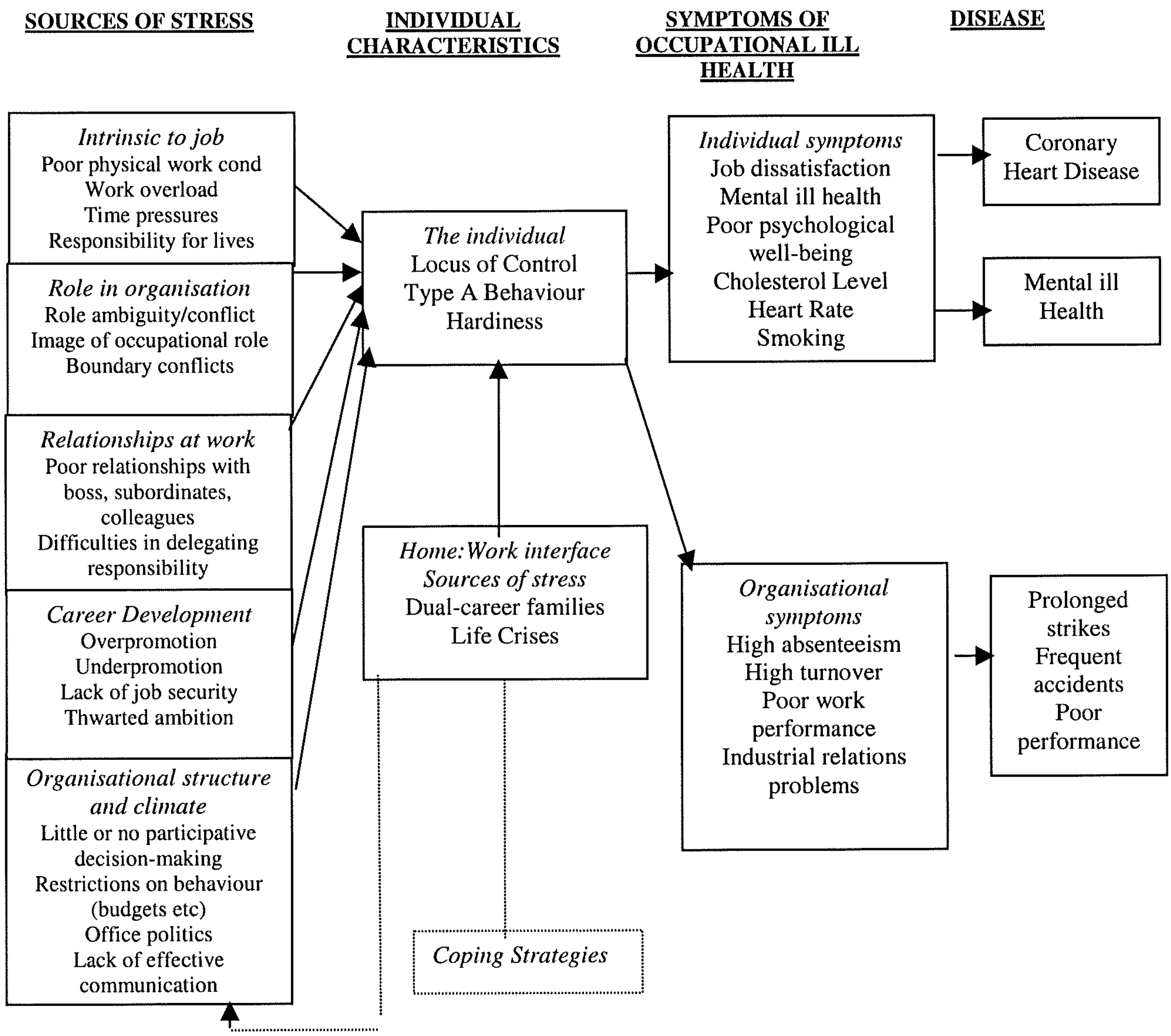
Transactional approaches also emphasise the influence of individual differences and cognition's upon the stress process. Stress is considered the result of interactions between the person and the environment, a process somewhat overlooked by both the stimulus and response based models of stress. More up-to-date models and theories have now replaced the models mentioned so far. Thus, the following sections review more recent transactional models in more depth that emphasis the numerous outcome and mediating measures associated within the stress process which is directly related to the present study.

1.4 Cooper's Model of Occupational Stress

Cooper's (1986) influential Work Stress Model was developed on the basis of four levels consisting of sources of stress, individual characteristics, symptoms of occupational ill-health and disease (see Figure 1.3).

Cooper's transactional stress model identifies five main workplace sources of stress categories of one level that were initially derived from previous research (e.g. Cooper & Marshall, 1976). The model therefore places a strong emphasis upon identifying the fundamental sources of occupational stress. The first category, factors intrinsic to the job, relates directly to an employee's job characteristics such as poor physical work conditions, workload and time pressures. The second category concerns an individuals role in the organisation and is identified by factors such as role ambiguity and conflict (i.e. the perceived image of the individuals role and conflicts). O'Driscoll and Cooper (1996) have found that negative aspects of these factors can lead to adverse effects on psychological well-being. Relationships at work are the third sources of stress category, which is characterised by poor relationships with work colleagues and problems in delegating responsibility. The fourth category concerns career development in relation to promotion, job security and ambition (e.g. the threat of redundancy and thwarted ambition and development). The final category is organizational structure and climate, which represents the effect of office politics and organizational restrictions of behaviour.

Figure 1.3: Cooper's (1986) Model of Occupational Stress



The individual characteristics level of the model assumes that the experienced sources of pressure are not only inherent in the work situation but are also mediated by two categories. Firstly, individual differences which reflects an individuals perceived control, Type A personality or hardiness, as well as other demographic features. Secondly, the home/work interface which reflects family/home life and work/balance cross-over effects i.e. factors such as life crises and family problems. Home/work interface is not considered a source of stress at work but rather has an effect upon the individuals' characteristics. Cooper (1986) proposed that the mediating effects of coping strategies via individual differences might also effect the experiences of occupational stress. The role of the control, home/ interface and coping factors and their relationship within the stress/well-being process shall be discussed in more detail within the following chapters three, seven (and chapter one 1.5) and two respectively.

The third level of Cooper's (1986) model is referred to as symptoms of occupational ill health and is divided into two main categories that consists of individual and organizational symptoms. Individual symptoms consists of physiological changes such as heart rate and cholesterol levels, behavioural changes such as variations in smoking and drinking habits and psychological changes that consist of factors that include mental ill health, low levels of well-being and poor job satisfaction. Factors that are characterised by organizational symptoms of occupational ill health are high absenteeism, high turnover, poor work performance and industrial relations problems.

The final level represents the disease or outcome factors that are the result of occupational sources of stress. This level of Cooper's model is again divided into both individual and organizational characteristics. Individual characteristics are represented by coronary heart disease (physiological) and mental ill health (psychological). Skills, frequent accidents and poor performance levels at work reflect organizational outcomes.

Cooper's (1986) model was however revised in 1990 by Robertson, Cooper and Williams. For example, the home/work interface was changed to a sixth sources of stress factor due to the recognition that stressors from work could act as a potential source of stress in non-working life. Non-work stress could then potentially transfer the effect on individuals' well-being at work. Another revision by Robertson et al (1990) to Cooper's (1986) model was to expand the original individual characteristics category of coping structure to contain five factors indicating that individuals may react in different ways to stress at work. This may then in turn act as moderators in the stress/well-being process.

1.4.1 Evaluation of Cooper's Model of Occupational Stress

Cooper's model of occupational stress basically proposes that different sources of stress from work maybe perceived by the individual, this might then result in either individual or organizational outcome problems. Individual differences and coping strategies may mediate this process.

It would appear that Cooper's (1986) model contains the fundamental basis of the stress process (sources of stress, individual differences, coping strategies and outcome measures). It also reflects the conceptual transactional approach to stress that considers stress as a consequence of the complex interaction between the person and environment. Support for the models structure examining the identification of different sources of workplace stress has been performed in previous research (for instance: and Guppy & Gutheridge, 1991 and Buunk & Peters, 1994). Other research investigating the influence of the second level reflecting individual characteristics (individual differences and home/work interface) within the occupational stress process have produced support for the model (e.g. Carver, Scheier & Weintraub, 1989 and Parkes, 1994). Similarly, individual and organizational symptoms associated with occupational ill health put forward within the structure of Cooper's model have also been identified within research studies (e.g. O'Leary, 1990 and Firth-Cozens & Hardy, 1992). Within the limited number of longitudinal studies that have investigated Cooper's level four disease outcome measures, findings are generally consistent with his model that an individuals' long-term experience of workplace stress does seem to result in low levels of psychological and physiological health (e.g. Aldwin, Spire, Levenson & Rosse, 1989 and Moyle, 1997). However, there does appear to be an insufficient time span within the longitudinal studies that were undertaken to enable an adequate measure of Cooper's disease outcome factors (Kohn & Schooler, 1982, Schonfeld, 1992 & Zapf, Dormann & Frese, 1996).

1.4.2 Criticisms of Cooper's Model of Occupational Stress

Perhaps the primary criticism of Cooper's model is that the model reflects organizational stress as opposed to occupational stress. For example, the sources of stress categories appear to be generic to organizations rather than to specific occupations. However, research has been undertaken to cater for this problem. For example, Cooper and Bramwell (1992) performed a stress related comparative study of managers and shop floor workers in the brewery industry and designed the measurement of sources of stress specific to the brewery industry occupation via interviews with employees.

Also, the models left to right structure of the stress process seems rather basic. For instance, other models such as Lazarus and Folkman (1986) suggest a more complex transactional interaction between person and environment where the individual processes numerous feedback loops via coping strategies in an attempt to determine the stress outcomes. On this note, the model also fails to note that there may be alternative causal factors within the stress process. For example, Spector, Dwyer and Jex (1988) propose the idea that outcome measures (individual and organizational symptoms) causes the perception of stress as opposed to the reverse, known as the reverse causality model. Alternatively, the reciprocal causation model suggests that sources of stress are both cause and effect of stress outcomes (i.e. stressors cause stress outcomes as well as stress outcomes causing stressors). Further, the external cause model states that dispositions cause the perception of stress and outcome. Thus, Cooper's model appears somewhat rigid in its left to right causal process.

Another criticism was revealed in Parkes (1994) study, which showed how individual differences could have an effect at different stages of the stress process. The same study also proclaimed that neuroticism as an individual difference variable has found to have a relationship with well-being outcomes. These concepts are not shown in Cooper's model. Cooper's model also does not account for the idea that coping strategies and individual characteristics may have a direct, moderating or interactive influence on stress outcomes

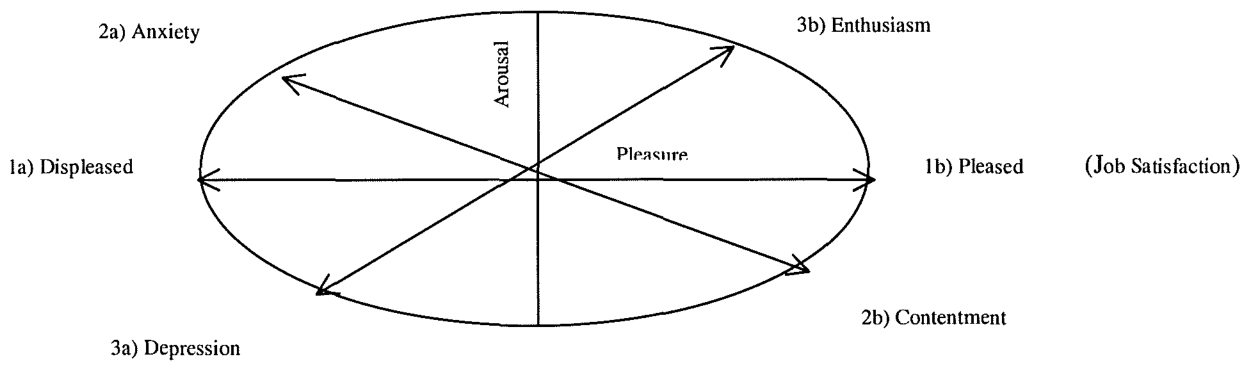
1.5 Warr's Model of Well-Being

Warr's (1987) model of well-being puts forward a view of occupational stress which focuses upon an individuals mental health within the workplace. Alternatively, to other models, he distinguishes between the domains of context-specific well-being (job-related) and context-free well-being (non-job-related). Due to no single agreed definition of mental health, Warr considers that mental health can be considered in terms of five main components: affective well-being, competence, aspiration, autonomy and integrated functioning. However, within occupational stress research, almost exclusive attention has been directed upon the first component, affective well-being (Warr, 1987, 1994).

1.5.1. Affective Well-Being

Warr (1987) proposed that affective well-being should be best viewed in terms of its location on two separate dimensions of well-being referred to as 'pleasure-arousal' as opposed to being measured along a single dimension (i.e. from feeling bad to feeling good). For example, high or low levels of arousal and vice versa may accompany a particular level of pleasure. There are three principal axes of affective well-being within Warr's (1987) two dimensional model: Displeased-Pleased, Anxiety-Contentment and Depression-Enthusiasm (see Figure 1.4). A person's well-being is described in terms of its location relative to the two dimensions. Warr (1990) developed a measurement scale based upon the diagonal axes two and three (anxiety-contentment and depression-enthusiasm) both measuring six affective states of well-being. The six affective states representing axes two are tense, uneasy, worried, calm, contented and relaxed. The six affective states representing axes three are depressed, gloomy, miserable, cheerful, enthusiastic and optimistic. Horizontal axes are displeased-pleased and represent job satisfaction within the occupational stress literature.

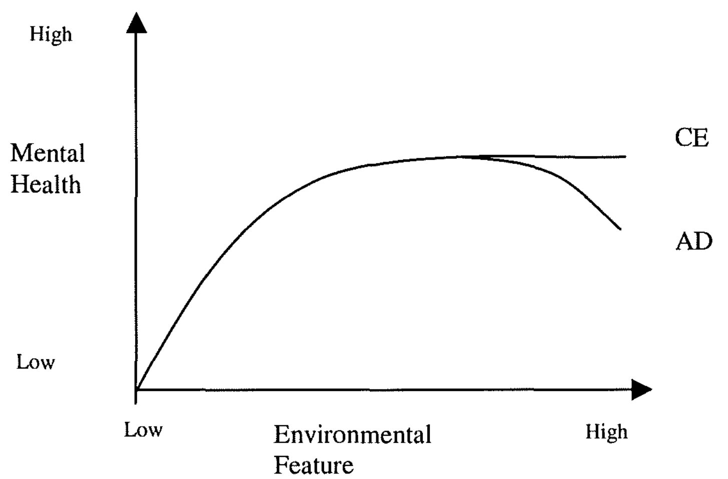
Figure 1.4: Three Principal Axes for the Measurement of Affective Well-Being.



1.5.2 Warr's Vitamin Model

Warr (1987) considered nine principal factors which may potentially influence a persons well-being and mental health. This concept is similar to Cooper's (1986) transactional model of occupational stress, in relation to the effect of the five categories of sources of stress upon symptoms of occupational ill health and disease. However, Warr's features can be incorporated with both work-related and context-free domains. According to Warr (1987), "Mental health is assumed to be influenced by the environment in a manner analogous to the effect of vitamins in physical health". He suggests that the intake of vitamins up to a certain point is advantageous to physical health. However, vitamins in large doses are harmful. Similarly, the absence of environmental features impairs mental health whereas their presence beyond a certain point impairs mental health. Hence, Warr (1987) considers the association between environmental features and mental health as non-linear. The model acknowledges that a particular feature can both enhance or impair mental health depending on its level and duration. Figure 1.5 reflects the curvilinear association between mental health and features within the environment.

Figure 1.5: Warr's (1987) Vitamin Model



The nine environmental features can be applied to any environment, not only to jobs. The nine features are, opportunity for control, opportunity for skill use, externally generated goals, variety, environmental clarity, availability of money, physical security, opportunity for interpersonal contact and valued social position.

The following shall give brief descriptions of all nine features. The first feature of the environment, which may effect mental health, is opportunity for control, which reflects the degree to which an environment permits a person to control activities and events. Other related descriptive terms in the literature comprise of autonomy, decision latitude and participation in decision-making.

The second characteristic, opportunity for skill use, concerns the level to which an individual has the opportunity to use or develop their skills. Related terms include skill utilisation and required skills.

The third feature of Warr's (1987) model is externally generated goals (or goals and task demands). This feature is divided into three sections. The first section, intrinsic job demands relates to how moderate levels of external goals seem to contribute to a person's well-being. The second section (task identity and traction) concerns the structure of work goals (task) and the rhythm of a job (traction). Finally, time demands which concerns the pattern of time demands arising from work and non-work activities. Related terms are demands, qualitative and quantitative workload and role conflict to mention a few).

Fourthly, Warr suggests the importance of moderate levels of variety i.e. non-repetitive activities, and varied roles and skill variety.

The fifth determinant of mental health is environmental clarity which represents an individuals capacity to understand his or her environment and their ability to predict what will happen. There are three types of clarity; information about the results of behaviour, information about the future and information about required behaviour. Task feedback, future ambiguity and role ambiguity are alternative associated terms of the three types of environmental clarity mentioned respectively.

Availability of money is the sixth element of Warr's model. This concerns an income that is consistent with a person's standard of living and that is equal in comparative terms to ones colleagues. Terms associated are income level, absence of poverty and material resources.

The seventh feature reflects the suitability of an individuals physical working conditions such as lighting, heating and safety (physical security). Related terms include absence of danger, adequate health and safety conditions and low physical risk.

Warr's eighth characteristic is opportunity for interpersonal control and concerns an individuals opportunity for person contact and interpersonal relationships within their environment. Associated terms are contact with others, social and emotional support and good communications.

Finally, the ninth environmental feature, which may potentially impact upon a persons mental health is values social position which reflects the degree of social prestige related with a particular role within an environment. Related terms include social rank, job importance and personal evaluations of task significance.

Warr (1987) notes that although the nine environmental features within his model are referred to separately, nevertheless, they do have different degrees of influence upon one another.

1.5.3 Other Aspects of Mental Health

In addition to affective well-being, another three main components of mental health exhibited via behaviour in transactions with the environment are competence, aspiration and negative carry-over. These three components are intrinsically related to affective well-being but nevertheless distinct (Sevastos, Smith & Cordery, 1992). Warr (1990) makes a distinction between the affective and cognitive components of well-being. Cognitive well-being refers to aspects of well-being that are non-hedonic sensations such as competence and aspiration. Affective well-being was discussed at length in section 1.5.1.

Competence "concerns a persons ability to handle life's problems and act on the environment with at least a moderate amount of success." (Warr, 1994). Since it would appear that everyone is not competent at everything, low competence is not always associated with low mental health. Throughout the literature competence has been referred to in terms of environmental mastery (Jahoda, 1958), ability to cope (Bradburn, 1969) and beliefs about self-efficacy and expectations of personal mastery (Bandura, 1977). Warr (1987) acknowledges that competence has an intrinsic association with affective well-being which may moderate or have a direct effect upon environmental factors that may have an impact upon mental health outcomes.

Aspiration refers to an individuals interest and efforts to establish goals and to attain them. A mentally healthy person is viewed as someone who establishes realistic goals within the environment and makes efforts to achieve them (Warr, 1990). Motivation, alertness to new opportunities and efforts to meet challenges reflect high levels of aspiration within an individual. Apathy and acceptance of the present state reflects low levels of aspiration (Warr, 1987). However, a person with high levels of aspiration may not always be free from anxiety from a mental health perspective. Warr (1987) notes that a person that aspires to attain personal goals may also create stressful encounters through their pursuits, which could adversely, result in negative mental health symptoms.

Further distinction between affective a cognitive well-being is worth a brief mention. It appears that cognitive well-being is more stable over time (Eid & Diener, 1999) whereas affective well-being is more stable over short time periods such as three to six months (Chamberlain & Zika, 1990). This indicates that cognitive well-being may be more influenced by dispositional characteristics and that affective well-being may be more influenced by life events. It also suggests that over time, such as within longitudinal research like the current studies design, that both affective and cognitive well-being may have different predictive influences.

The negative carry-over component of mental health considers the links between work and non-work environments (Warr, 1996). Also referred to as 'spillover' or work carryover and non-work carry-over. Research has been undertaken to examine the extent to which work experiences carry-over into non-work life and the extent that non-work experiences carry-over into working life (Tait, Padgett & Baldwin, 1989).

Piotrkowski (1978) identified between negative and positive work/family carry-over. Within a study measuring employed husband's job and family life satisfaction. For example, husbands who experienced low affective well-being at work found that this spilled-over into non-working home life in which the family consequently experienced lower levels of well-being (negative work carry-over). Alternatively, husbands who experienced high affective well-being at work found that this also spilled-over into home life where the family consequently experienced a greater level of well-being (positive work carry-over). Crouter (1984) performed a study exploring the reverse perspective focusing on family-to-work spillover and revealed that both positive and negative family experiences influenced both positive and negative work experiences respectively. In contrast to the spillover hypothesis is compensation (Warr, 1987). The compensation hypothesis predicts negative relationships, in that when individuals strive for non-work pursuits (high well-being), this experience compensates for the inadequacies in the person's job (low well-being). However, in a review of the literature concerning the association between work and non-work experiences evidence overall favoured the spillover hypothesis than the compensation hypothesis (Staines, 1980). The next section (1.5.4) shall expand on the concept of carry-over/spillover and will discuss work, non-work and context-free environments within occupational stress research.

Further, Warr (1987) also notes within his model the effects of individual differences and demographic features such as age, gender and job grade etc within the stress/well-being process. In particular, he refers to the personality traits of negative affectivity and positive affectivity. These traits reflect a person's individual feelings about themselves and the influence upon an individuals response to features in the environment and their well-being. Warr (1987, 1996) considers the association between well-being and work performance and suggests that high work performance in employees may influence greater levels of well-being. However, such causal relationships seem inconclusive (Warr, 1996). Chapters five and six deliberate the role of individual differences and work performance within the current research in more detail.

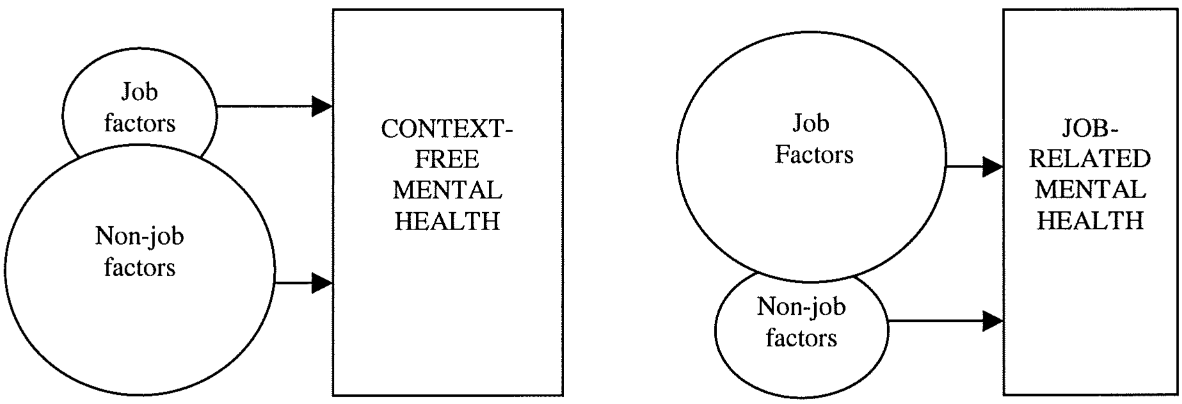
1.5.4 Work, Non-Work and Context-Free Well-Being

Warr (1987) also established the distinction between work-specific, non-work and context-free well-being. Context-specific mental health is observed within a single setting. For instance, within this case, an individual's workplace (i.e. work-specific). Non-work well-being refers to all other settings apart from the workplace (life outside of work/non-working life etc) such as home/family life, social life, educational networks and leisure etc. Context-free well-being refers to a person's state of well-being in life in general (i.e. everyday well-being regardless of context). Warr (1987) established the distinction between the three domains so that affective well-being as well as the other components of mental health (competence, aspiration and carry-over) can be treated and measured within the three domains. See Near, Smith, Rice & Hunt (1983) for a more detailed definition of the three above mentioned domains.

Similar to the carry-over effects discussed in the previous section 1.5.3, spillover effects between work and context-free well-being has also been previously researched. Results from Orpen back in 1978 strongly suggest that the direction of causality from work to context-free satisfaction is stronger than that in the opposite direction. Alternatively, and more recent, Judge & Watanabe (1993) undertook a similar longitudinal investigation to again identify the pattern of causality between job satisfaction (work-specific well-being) and life satisfaction (context-free well-being). Findings indicated that the effect from context-free well-being to work-specific well-being was greater than the reverse direction although still significant. Schmitt & Mellon (1980) also reported the same results. However, overall, the study suggested that the direction of causality between work and context-free well-being was a positive reciprocal (two-way) association. Miles (1975) and Bamundo & Kopelman (1980) support this view in their longitudinal studies.

Warr (1987) further discusses the effect of job and non-job features upon job-related and context-free well-being (see Figure 1.6). The larger circle and its associated factor name indicate the importance of effect. In relation to context-free mental health, Warr suggests it most probable that non-job factors are more strongly associated than job factors. Alternatively, in regard to job-related mental health, Warr indicates that job factors are probably of greater significance than non-job factors. Overlap between circles shows the mutual association between job and non-job factors. The concept of work-specific, non-work and context-free domains and the interrelationships amongst numerous variables within the stress and well-being literature shall be discussed in more depth in Chapter Five (section 5.3).

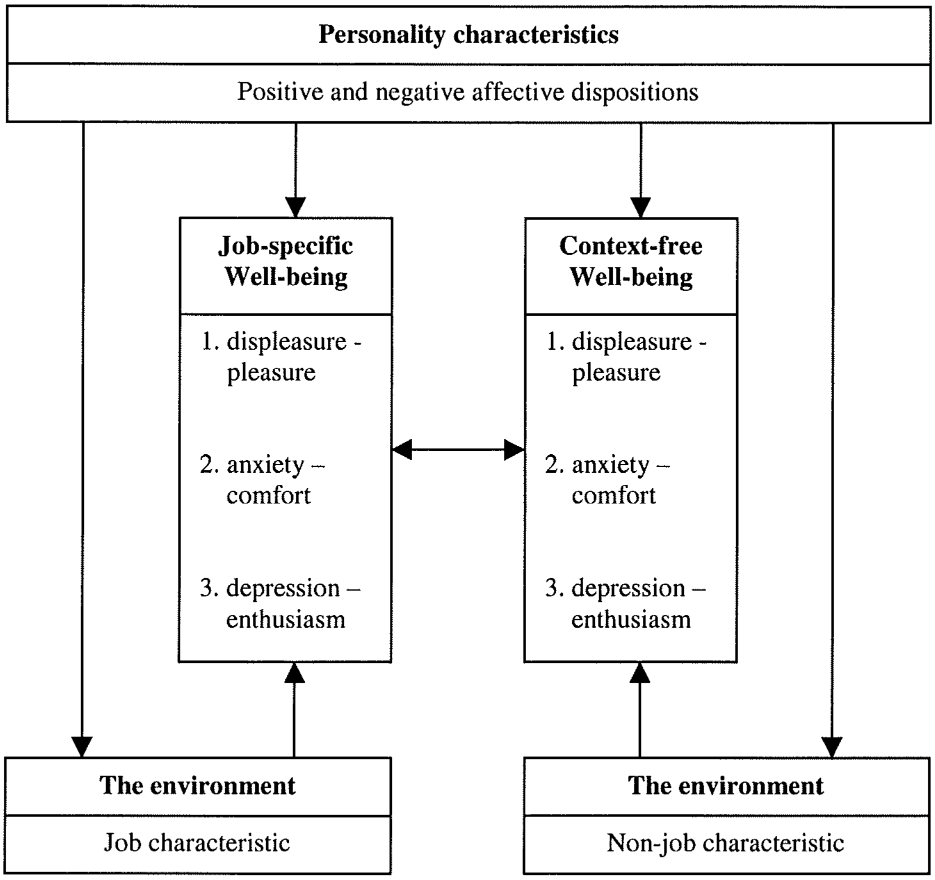
Figure 1.6 Schematic Representation of the Importance of Job & Non-Job Factors Influencing Context-Free & Job-Related Mental Health



1.5.5 Evaluation of Warr's Model of Well-Being

In order to assist in the evaluation of Warr's (1987) model of well-being outlined so far, and to be discussed throughout the contents of the forthcoming sub-sections (1.5.5 and 1.5.6), a schematic diagram representing his model is shown in Figure 1.7 (Warr, 1996).

Figure 1.7: Schematic Representation of Warr's Model of Well-Being



Warr's (1987) model of well-being and mental health appears to provide a substantial understanding of occupational stress research which emphasises the complex nature of simultaneous interactions between the person and environment. Warr's model expands on previous theories by introducing a more complex multi-component perspective of both occupational stress and mental health as opposed to simply measuring organizational psychology. The model also suggests how different features of the environment can affect both positive and negative aspects of mental health and can be measured in both work-related and non-work related contexts. Warr's development and recommendations reflect an increase in interest in occupational health and safety in the Western world, and an expansion of concern regards the prevalence of stress-related conditions and mental health disorders within the workplace (Levi, 1990 and Ganster & Schaubroeck, 1991).

There has however been conflicting support for Warr's two-dimensional framework of well-being. Warr (1990) found that the two axes were related with different work features. Thus, higher occupational level was found to be positively associated with depression-enthusiasm and negatively associated with anxiety-contentment. Watson, Clark & Tellegen (1988) and Matthews, Jones & Chamberlain (1990) produce further evidence supporting this two-dimensional concept. Nevertheless, more recent findings have suggested that the two-dimensional model needs refining (Sevastos, Smith & Cordery, 1992). For example, indications are that there need to be changes to items within the two-axes scales by replacing items uneasy and contented (anxiety-contentment) and cheerful (depression-enthusiasm) with anxious and comfortable and motivated respectively. Sevastos et al (1992) also suggests the re-labelling of the anxiety-contentment axes to anxiety-comfort. Moreover, Daniels, Brough, Guppy, Peters-Bean & Weatherstone (1997) revealed evidence of a more complex model of affective well-being consisting of five substantive factors. Similarly, Daniels (2000) has also provided evidence for scales that measure five aspects of affective well-being that go beyond the two primary dimensions. These five aspects of well-being are; anxiety-comfort, depression-pleasure, bored-enthusiastic, tiredness-vigour and angry-placid. Thus, confirmatory factor analysis research incorporating numerous samples of data from both Daniels et al (1997) and Daniels (2000) support a multi-dimensional framework of affective well-being.

Warr's (1987) Vitamin model which suggests a non-linear (curvilinear) relationship between components of the environment and mental health (see Figure 1.5) has been supported by some research (French, Caplan & Van Harrison, 1982, Edwards & Cooper, 1990 and Gallego, Mahiques & Saria, 2000). Dawis & Lofquist produced earlier evidence in 1984 of a non-linear association. Findings from their study showed evidence in support of a balance between demands and abilities emphasising that employees can have too much as well as too little of a job characteristic. Warr (1994) notes that "for whatever reason, most authors assume that relations between job features and mental health are purely linear. That seems inconsistent on both conceptual grounds and in terms of some available data." Warr (1994) also goes on to further note that high methodological requirements are required to examine curvilinear relationships and that this factor ensures that most studies investigate only linear associations between variables. Methodological requirements necessary include large sample sizes of around 1000 participants and a wide range of occupational measures. However, these methodological requirements were met in investigations by both Warr (1990) and De Jonge and Schaufeli (1998) with sample sizes of 1686 and 1437 respectively. Results showed a curvilinear relationship pattern between job characteristics and employee well-being.

General support exists within the literature for all nine component features from Warr's model having an effect upon a persons mental health (opportunity for control, opportunity for skill use, externally generated goals, variety, environmental clarity, availability of money, physical security, opportunity for interpersonal contact and valued social position). For example, (and in direct relation to variables measured in the present study), job demands and workload (externally generated goals) indicate that a low level of control at work seems to suggest a low level of mental health at work and vice versa (Warr, 1987, Jackson, 1989 and Payne, 1988). Similarly, research produced has also supported Warr's eighth environmental feature (opportunity for interpersonal contact). Findings suggest that positive interpersonal relationships at work appear to be associated with positive well-being (Billing & Moos, 1982).

It would seem that Warr's (1987) three additional features of mental health; competence, aspiration and negative carry-over expands the concept of evaluating and measuring a complete sense of mental health.

For example, Myers back in 1982, prior to Warr's (1987) acknowledgement of the contribution of competence to mental health, supported the concept that interpersonal competence interacts in a complex way to affect both coping behaviours and stress. More recently, both Bhagat & Allie (1989) and Kelloway & Barling (1991) similarly support the notion that job-related competence (as well as job-related well-being) mediates the relationship between job characteristics and stressors and context-free mental health. For example, Bhagat & Allie (1989) found that when workplace stress is high, individuals who consider themselves to be relatively competent within their work environment report greater levels of workplace well-being than those who consider themselves as being less competent do.

Support for the contribution of aspiration as an addition to affective well-being within Warr's model originates from the work of Herzberg (1966) who investigated the effect of work characteristics on psychological growth through his motivation-hygiene theory. He argues that an individuals well-being is determined by satisfied aspirations in both work and non-work domains of life. Support also comes from Maslow's (1973) theory of 'Self Actualisation'. There does however appear to be a lack of clear evidence in previous studies indicating the contribution aspiration plays in the stress/well-being process.

In relation to the negative carry-over component (or spillover), Warr (1987) notes that almost all carry-over research focuses upon the experiences of work to home (non-work) with limited evidence of the influence of home to work (see Evans & Bartolome, 1980 and Doby & Caplan, 1995). However, a growing body of evidence within occupational stress research supports the bi-directional (reciprocal) nature of the work/non-work spillover (or home-work interface) concept within Warr's model (Greenhaus & Parasuraman, 1987 and Frone, Yardley & Markel, 1997). For example, Leiter & Durup (1996) performed a longitudinal study measuring psychological demands in the workplace and at home which showed evidence of spillover from work to home and the reverse from home to work. Other studies support these findings (Frone, Russell & Cooper, 1992, Watkins & Subich, 1995 and Adams, King & King, 1996, Arthur, 2002) and thus indicate that occupational stress theories can not ignore non-work aspects of employees' lives. More recently and alternatively, Grzywacz, Almeida & McDonald (2002) performed a study using different types of data and methodologies from nationally representative samples to examine work and family spillover across a wide range of socio-demographic characteristics. Analysis incorporating family life course theory, which focuses upon the importance of social structural context (Bengtson & Allen, 1993), revealed that negative and positive work and family spillover are not randomly distributed within the labour force. Thus, indicating that work and family spillover differ by multiple demographic characteristics.

There appears to be only limited evidence in support of Warr's (1987) alternative compensation hypothesis. For example, variables measuring married women workers indicated negative associations between poor job ratings and high scoring non-work activities (Warr, 1987). However, an interesting review by Lambert (1990) suggests that the spillover, compensation and segmentation processes linking work and non-work/home life should operate together as opposed to being treated as competing explanations as suggested within the literature. The review also puts forward the idea that other alternative processes may also link work and home life, such as that employees may limit their involvement in work or family life in order to better accommodate the demands of the other.

Research investigating relationships between work-related and context-free well-being discussed in section 1.5.4 have been in favour of Warr's (1987) model. For example, Hart (1999) found that job satisfaction (work-based well-being) and life satisfaction (context-free well-being) were significantly associated (similarly, see Judge & Watanabe, 1993). Moreover, further support can be found for the more elaborate and complex relationship amongst work and non-work experiences and their influence upon work-related and context-free well-being put forward by Warr (1987). For example, results from Frone et al (1992) found that job and non-job stressors were positively related to their respective within-domain job and non-job measures of well-being i.e. work stressors are more strongly related to work well-being than to non-work well-being and vice versa (see Figure 1.6). More recent studies support these findings (Hart, 1999 and Edwards & Rothbard, 1999). Hart (1999) argues further to emphasis that the work and non-work domains operate along two distinct paths and support a segregation model rather than a spillover model. For instance, Hart (1999) found no spillover effect between work experiences (work stressors) and non-work well-being or between non-work experiences (non-work stressors) and work well-being. However, conflicting earlier research by Frone, Russell & Cooper (1991) suggest that job stressors make an independent contribution to the prediction of context-free mental health.

1.5.6 Criticisms of Warr's Model of Well-Being

Although Warr's (1987) model indicates causal pathways between environmental features (job characteristics) and workplace mental health, there is no indication of reverse or reciprocal pathways. However, in an investigation in 1994, Warr does suggest that work-based mental health seems to act as a mediating factor between job characteristics and non-work mental health (also see Kelloway & Barling, 1991). There have only been a limited number of studies that have indicated a significant reciprocal relationship between stress and well-being measures (James & Jones, 1980, Bateman & Strasser, 1983, Kohn & Schooler, 1982, James & Tetrick, 1986, Schwarzer, Hahn & Jerusalem, 1993, Taris, Bok & Calje, 1998 and de Jonge, Dormann, Janssen, Dollard, Landeweerd & Nijhuis, 2001). However, Marcelissen, Winnubst, Buunk & De Wolf (1988), Glickman, Tanaka & Chan (1991) and Schonfeld (1992) found no reciprocal effects in their studies. Moreover, Zapf et al (1996) revealed there also to be inconsistent findings regarding the direction of causality between job feature characteristics and workplace well-being outcome measures from the 16 longitudinal studies on organizational stress that have tested for reverse causation. Zapf et al (1996) suggests that future research into more complex models measuring the associations between occupational stress and psychological well-being, including reciprocal relationships, should be investigated. Spector, Dwyer & Jex (1988) also support the idea that future research should attempt to test alternative causal models, using multiple sources of data, complex causal modeling and longitudinal design to advance the understanding of the stress/well-being process. Chapter seven shall discuss in more detail the causal pathways amongst organizational stress research.

Despite the importance of Warr's (1987) additional carry-over feature of mental health, as well as the distinction between the three domains of well-being (work, non-work and context-free), nevertheless, the model does appear to be too simplistic and lacks a clear understanding and definition of the domains in question. For example, within Warr's model which represents the importance of job and non-job features in relation to their influence upon job-related and context-free well-being, there is no indication of the significance of non-job well-being and its relative associations with other variables (see Figure 1.6).

Nonetheless, Edwards & Rothbard (1999) performed a study measuring associations between work and non-work stressors and their influence upon all three domains of well-being (work, non-work and context-free). Findings reveal that within the work domain, stressors are more strongly related to work well-being than to both non-work or context-free well-being. Similarly, within the non-work domain, stressors are more strongly related to non-work well-being than to both work and context-free well-being. Thus, research suggests that stressors are more strongly associated to within-domain well-being than to across-domain or context-free well-being. Findings are similar to Warr's (1987) model in principal (see Figure 1.6), however, without considering non-work well-being. Nevertheless, context-free well-being was more strongly related to non-work well-being than to work-related well-being.

Hart (1999) found similar results within the dynamic equilibrium theory of stress (Hart, Wearing & Heady, 1993) in that non-work well-being contributed more stronger than work-related well-being to context-free well-being. Near, Smith, Rice & Hunt (1983) in two data sets found that job satisfaction (work-based well-being) represented as little as 1% of the total variance explained in life satisfaction (context-free well-being). Other similar studies conclude that job satisfaction explains approximately 5-10% of the variance in life satisfaction (Rice, Near & Hunt, 1979). Thus, research which expands on

Warr's (1987) three domain measurement of well-being indicates that the work domain contributes relatively little to an individuals everyday well-being and that context-free well-being can reveal more about the non-work domain of an employees life than the workplace. This is inconsistent with Warr's (1987) model that states that work experiences contribute significantly to context-free as well as work-related well-being. Although Warr (1987) did vaguely state that numerous different sequences of relationships and overlap between the work and non-work domains were likely to exist which could broaden the results of research, however, the pattern of associations and causal directions was non-specific.

Further criticisms of Warr's model in relation to his proposed causal pathways and associations between stressors and well-being across domains, concerns the issues of reverse and reciprocal causality between stressors and well-being across domains (not spillover across domain for either stressors or outcome measures). For example, there appears to be no indication from Warr's (1987) model of the simultaneous reverse effects of job, non-job and context-free well-being upon job and non-job stressors, nor a reciprocal relationship. Investigations that have explored reverse relationships in this direction as well as reciprocal associations have only measured work-based stressors and work-based well-being, which was discussed earlier within this sub-section. Thus, previous investigations measuring the elaborate causal effects of well-being (across domains) on the sources of stress process (across domains) is limited (see Figure 1.9 that follows). The intricate examination of the effect of an individual's out of work well-being upon environmental features or the stress process would clearly contribute to the understanding of the discipline.

Since the complex causal pathway relationships between the stress and well-being variables discussed throughout Chapter One can become confusing when considering all three domains of life as well as one-way, reverse and reciprocal causality, both Figure 1.8 and 1.9 have been produced to assist in the understanding of the associations. Both diagrams are predominantly based upon models and theories by Cooper (1986) and Warr (1987) who both were somewhat unclear in regards to the causal direction of the variables they were investigating. Figure 1.8 basically reflects the significant causal relationships between stress and well-being across domains that have been reported and confirmed before over the years by numerous previous authors discussed already within Chapter One (single headed arrows indicate direction of causality, double headed arrows indicate reciprocal relationships).

Figure 1.8: Significant & Consistent Causal Pathways Researched by Previous Authors between Stress & Well-Being across Domains

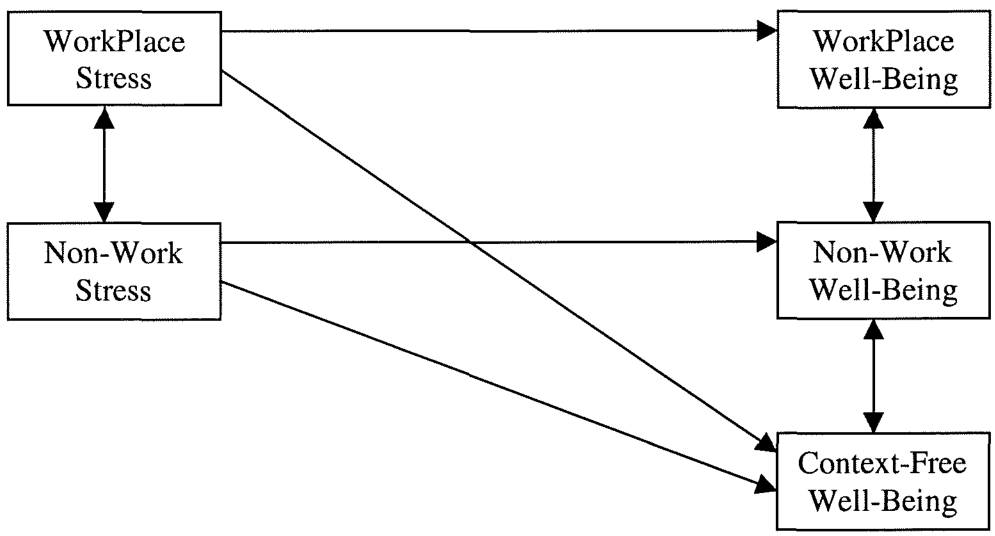
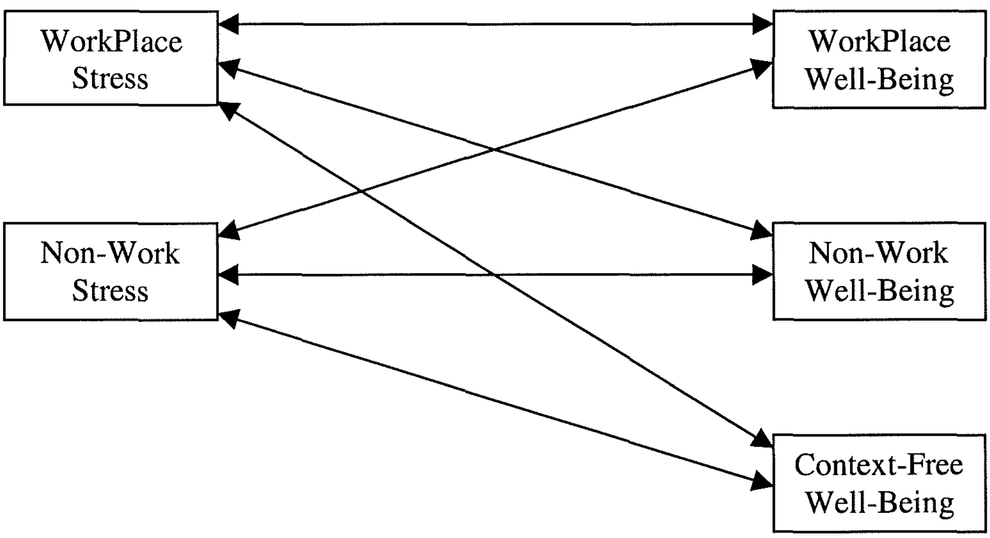


Figure 1.9 alternatively shows the inconsistent and conflicting findings from previous research examining the causal pathways between the same variables as well as representing reciprocal relationships that have never been studied before by other authors. Past studies that have investigated relationships between variables represented in Both Figures 1.8 and 1.9 have been discussed at length at some point throughout the present chapter.

Figure 1.9: Inconsistent & Un-Researched Causal Pathways between Stress & Well-Being



1.6 Occupation Specific Stress & Well-Being Investigations

Within the current chapter so far, the review of the theoretical stress and well-being literature has been derived from previous studies that have incorporated the use of a wide range of different data sources across many different occupational groups in order to perform their analysis. The following sub-section shall review previous research undertaken measuring the relationship between stress and well-being which uses samples of data that are directly consistent with the samples used within the present research in order to compare findings. These groups of participants are university staff employees, working/non-working students and trainee nurses. SECTION B shall discuss in depth the characteristics of these samples. Due to word count limitations, only a brief review of the most recent and most relevant studies shall be discussed i.e. research projects undertaken which uses the above mentioned samples as data and that mainly incorporate longitudinal design.

1.6.1 University Staff

During the 1990's, a decrease in government funding in universities, especially in Australia, New Zealand and Britain, has resulted in significant changes which has increased stress levels in university staff (Association of University Teachers, (AUT), 1994, Fisher, 1994, National Association of Teachers in Further and Higher Education (NATFHE), 1994, Winefield, 2000 and Winefield & Jarrett, 2001).

Most of what is known about stress amongst university workers is derived from several studies conducted in the USA. In 1994, Blix, Cruise, Mitchell & Blix reported that 66 per cent of a large sample of university lecturers perceived severe levels of stress at work at least 50 per cent of the time. These authors concluded that most of the stress experienced by the respondents related directly to limited resources or shortage of time. There were, however, other causes for concern within the profession: these included slow progress in career advancement, poor faculty communication, professional disillusionment and inadequate salaries. Further studies have concluded that a significant proportion of stress experienced by academics is likely to emanate from the competing demands of career and family life, and long working hours, both on and off campus, (Sorcinelli & Gregory, 1987). In direct association with the sample used within the current research, NATFHE report that high levels of occupational stress are being experienced by British higher education academic institutions and in particular universities of the former polytechnic sector (Kinman, 1996). The Association of University Teachers (AUT, 1998) further point out that two-thirds of university staff's non-working life suffers due to workplace stress.

Nonetheless, only limited attention has been given to studies that have examined the relationship between stress and well-being in university staff (Spector et al. 1988, Snape, 1988, Daniels & Guppy, 1994, Kinman, 1996, AUT, 1998, Kinman, 1998, Edwards & Rothbard, 1999, Lease, 1999 and Collins & Parry-Jones, 2000). Travers and Cooper (1991) showed that lower levels of mental health were found for teachers than for other highly stressed occupations. Similarly, Bradley & Eachus (1995) also reported that university staff showed poorer levels of well-being than a normative group in their study.

However, Winefield & Jarrett (2001) in their research found that high levels of stress were consistent with normal/average levels of psychological well-being, nevertheless, psychological distress was highest among academic staff. However, and more interestingly, a report was recently prepared to explore work-life balance issues among a sample of Middlesex University staff (Arthur, 2002). Results from the survey supported by Robertson & Cooper Ltd (RCL) suggest no spillover effects. For example, staff did not consider that work experiences spilled over on non-work life or that non-work experiences impinged on work activities.

Although Fisher (1994) states that longitudinal studies on stress in academic's is difficult because of changes in employment which makes anonymous questionnaire follow-up recording of respondents names impossible, a single longitudinal study was performed measuring stress and well-being in teachers by Schonfeld (1992). The sample used within the study (first-year teachers) is not exactly university staff, but are nevertheless similar in their occupation to academic/lecturers within universities. Longitudinal design enabled the author to test for reciprocal and cross-lagged effects. Finding show that the reciprocal effect's model between workplace characteristics and outcome symptoms of well-being at both time points one and two failed to fit the data satisfactorily. Regardless, the stress-well-being effect was greater than the reverse effect (well-being-stress) consistently at both time points. The lagged-effects model across time-waves between the same variables failed to fit the data adequately. Thus, there appears to be inconsistent findings produced in regards to the association between stress and well-being in university staff samples in the literature. Also, findings in relation to the interrelationships and causal pathways between variables in university staff populations are somewhat inconsistent with that of other samples of data.

1.6.2 Working & Non-Working Students

There doesn't seem any research undertaken that measures the relationship between stress and well-being in working students or for that matter non-working students.

However, Mosley, Perrin, Neral, Dubbert, Grothues & Pinto (1994) in their study of third-year medical students revealed that stress accounted from up to 50% of somatic distress variance as well as 23% of students experiencing clinical levels of depression. Yang & Lester (1988) noted that increasing numbers of student's work to pay their way through university. In their analysis of working students and course performance, working didn't appear to result in lower grades. More recently, Ruscoe, Morgan & Peebles (1996) note that working students demonstrate an astonishing range of work experiences while not differing particularly from non-working students in university. Fisher (1994) also notes that many university students experience substantial stress deriving from coping with academic workload demands, study patterns and financial restraints.

1.6.3 Trainee Nurses

There has been numerous previous research that has measured levels of stress in both qualified nurses and trainee nurses samples specifically (for instance, Rhead, 1995, Munro, Rodwell & Harding, 1998, Smith, Brice, Collins, Matthews & McNamara, 2000 and Sheu, Lin & Hwang, 2002). Interestingly and consistent with the sample of trainee nurses measured within the current study, Rhead (1995) examined academic stress as well as the practical aspects of on ward stress in two groups of nurses (Registered General Nurses, RGN and Diploma if Higher Education in Nurses, Dip HE Nursing). Results indicated that Dip HE Nursing students showed significantly higher levels of stress than the RGN nurses in both academic and practical work. Findings suggest that the nursing environment is a highly stressed one.

However, studies investigating the relationship between both stress and psychological well-being within the nursing environment is more limited (Minnes, McLachlan & Cotton, 1995, De Jonge & Schaufeli, 1998 and Kirkcaldy & Martin, 2000). Not surprisingly, research generally indicates that high levels of stress are significantly related with low levels of well-being (Jeurissen & Nyklicek, 2001). In line with the present study, Jones & Johnston (1997) undertook a study of first-year student nurses around the time of initial work placements (the same stage as the present studies trainee nurses' sample). Results indicated that 50.5% and 67.9% of nurses reported significant degrees of negative well-being deriving from sources of stress. The level of stress experienced by the nurses exceeds levels reported in published studies of other nursing populations and the general female population.

Bacharach, Bamberger & Conley (1991) undertook a study examining work-home conflict among nurses. Findings reveal a model in which job stressors have both direct and indirect effects via work-home conflict on job well-being.

There only appears to be a handful of longitudinal investigations measuring stress and well-being associations in nurses (Parkes, 1982, Bateman & Strasser, 1983 and Leiter & Durup, 1996). For example, Bateman & Strasser (1983) found in a sample of nurses that job strain (stress) and job satisfaction (well-being) are reciprocally (negatively) related. The only study however that specifically uses student trainee nurses within a longitudinal design study whilst measuring stress and well-being variables is by Parkes (1982) over two decades ago. She found that job demands/workload (stress) was not significantly associated to both anxiety and depression (affective well-being). It seems again as though there is inconsistency in findings from the literature in relation to the relationship between stress and well-being in specific nursing samples.

1.7 Summary of Chapter One

Chapter One describes the theoretical occupational stress and well-being models. Initially, however, the chapter acknowledges that the impact and prevalence of occupational stress upon organizations and employees is extensive and costly to the U.K. and U.S. It was argued that both the stimulus and response-based models of stress are now broadly perceived as rather limited, although they provide some basic useful information. Transactional models by stress by Lazarus (1966) and Cox (1978) were consequently reviewed which emphasis the interaction between the person and the environment and the affect of individual differences and cognition's upon the stress process.

The two principal transactional models of stress were then explored (Cooper, 1986, and Warr, 1987). Cooper proposes a four level multi-component model that highlights the interaction between sources of stress, individual differences, symptoms of occupational ill health and disease. It was considered that although Cooper's (1986) model entails the basic components of the stress process, it nevertheless appears too rigid in its central left to right causal pathways amongst variables. Warr's (1987) alternative model expands the idea of occupational stress by considering a person's mental health and distinguished between work, non-work and context-free life domains. Warr's (1987) Vitamin model suggests that nine principal factors can potentially affect individuals' well-being (non-linearly) based upon a two-dimensional model. Three other main aspects of mental health considered in Warr's model are competence, aspiration and negative carry-over. Within the current chapter, it was concluded that Warr's (1987) model seems to provide a considerable insight into the understanding of occupational stress research that considers both aspects of stress and well-being across three domains. However, criticisms of Warr's model mainly focus upon the question of causality (similar to Coopers, 1986, model). Warr's model appears to lack a clear understanding of any reverse or reciprocal causal pathways and associations between job characteristics and mental health as well as the complex interrelationships between stressors and well-being across work, non-work and context-free domains.

The chapter concludes with a brief overview of previous studies undertaken measuring the association between occupational stress and psychological well-being in university staff, working/non-working students and trainee nurses samples specifically. A review of the limited research undertaken using these sample groups produced inconsistent results.

CHAPTER TWO: THEORIES & MODELS OF CONTROL

2.1 Overview of Chapter Two

This chapter briefly discusses the various theories and models of control and, in particular the role that control plays in the stress and well-being process within occupational and organizational health research. Pearlin & Schooler's (1978) concept of personal mastery shall be of primary concern throughout the chapter as it is of specific interest to the current study. Similarly to the previous chapters, a section that evaluates evidence to support or reject the theories and models discussed follows this. Further additional criticisms shall then be put forward in section 2.5 followed by a summary of Chapter Two.

2.2 Models of Control

"Personal control is being increasingly recognized as a central concept in the understanding of relationships between stressful experiences, behaviour and health" (Steptoe & Appels, 1989). However, there appears to be no clear single view of control amongst researchers in the area of occupational and organizational psychology (Karasek, 1979, Spector, 1982, 1986 and 1988 and LaRocco, 1987).

Rotter (1966) defined locus of control on the belief that actions are due to either personal factors (internal locus of control) or external factors (external locus of control), where one's own actions determine a particular outcome. However, the measure has been criticised due to its non-unidimensionality in that other authors have reported the measure consisting of other factors on a three-dimensional scale (Reid & Ware, 1973,1974).

Individual control has appeared in many stress research studies (Spector, 1982, 1986 and 1988, Parkes, 1991 and Jex & Spector, 1996). Evidence from Spector (1982,1986) suggests that there is a positive significant association between personal control and job satisfaction. Research seems to indicate that individual control within the workplace has a strong relationship within the occupational stress and well-being process.

Karasek's (1979) Job Demand-Control (JDC) model further developed the concept of workplace control. This model based upon the 'strain hypothesis', suggests that negative health outcomes are to be expected in jobs characterised by high job demand and low job control. Karasek (1979) suggests that strain does not occur via one single element of the work environment. He argues that both demands and different forms of decision making discretion made by the worker result in levels of strain. Ritti (1971) suggests that greater levels of well-being at work occur within jobs that are active, where the challenge of work demands as well as individual decision discretion is apparent.

This model was elaborated at a later date, indicating that individuals who experience adverse health outcomes at work, experience even worse job-related support referred to as the 'iso-strain hypothesis' (JDCS: Job Demand-Control-Support model). Thus, demands, control and support are therefore seen to be interrelated to determine an employee's well-being at work.

Karasek also noted that high levels of affective well-being within the workplace maybe achieved without a resulting decrement in employees work performance.

A most recent research report by Rick, Thomson, Briner, O'Regan & Daniels (2002) revealed that general forms of work demands were negatively influencing work outcomes, as were specific work demands in particular occupations like nurses, a sample incorporated within the present study. The report also indicates that low work control has a positive correlation with work-related outcomes. Health outcomes (well-being) were found also to result in having a negative effect from low control, however, there was some evidence of research that had no effect on health outcomes. Consistent with Karasek's JDCS, low levels of support at work was found to have a negative effect on outcome measures.

2.3 Pearlin & Schooler's Model of Control

One particular aspect of control which is closely related to perceived control is perceived mastery and has received some attention within the literature. Mastery differs slightly from control in that it reflects an individuals perception of accomplishment of some type. Guttmann (1974) describes two patterns of mastery that reflect Rotter's (1966) internal and external locus of control: active mastery (aggressive attempts to control external events) and passive mastery (use of self-control and inhibition of aggression to achieve individual well-being).

Moreover, Pearlin & Schooler (1978) introduced the concept of mastery as a psychological resource personal characteristic which an individual can draw upon to assist in the stress and coping process. They refer to this kind of personal mastery as the degree to which an individual considers one's life-chances as being under one's own control, as opposed to being determined by external factors. Pearlin & Schooler (1978) found that mastery produced significant results for effective coping in stressful situations in both everyday life (context-free) and within the workplace. In their research they suggest the relationship with well-being may be explained to some extent by the belief that when a person perceives life as being under one's own control, they are less probable to tolerate distressing circumstances by adapting and directly manipulating the stressor. Personal mastery is also supported within Bandura's (1977) self-efficacy theory.

Folkman, Lazarus, Gruen, & DeLongis (1986a) and Folkman, Lazarus, Dunkel-Schetter, DeLongis & Gruen (1986b) undertook an investigation to examine mastery and well-being. Results revealed that a perceived sense of mastery was positively related with general well-being within a general context-free domain of life. Mastery was also found to independently influence coping processes. Research investigating mastery within an occupational-specific domain has also been conducted and produced similar results. For example, Franks & Faux (1990) and Guppy & Weatherstone (1997) found that a strong sense of mastery was positively associated with well-being.

A research report produced by Arthur (2002) investigating control at work within the same sample of university staff as the present study revealed that employees have some control over their working lives.

2.4 Evaluation of Chapter Two

Within section 2.2, previous research suggested evidence to support the idea that there is a significant association between individual control and outcome measures (mainly Spector and colleagues). Nevetheless, most of the research conducted investigating control within the workplace is cross-sectional and therefore causation amongst variables is difficult to establish.

Karasek (1979) put forward the Job Demand-Control (JDC) model which suggests that negative psychological well-being is found in employees working in a high demand low-control environment. It had been suggested that this model has dominated research in occupational stress research over the past 10-20 years by authors (Muntaner & O'Campo, 1993 and Van Der Doef & Maes, 1999). A recent study by Pelfrene, Vlerick, Kittel, Mak, Kornitzer & De Backer (2002) provided evidence to support both the strain hypothesis (JDC) model and the iso-strain hypothesis (JDCS) model. A review of 20 years of empirical research on 63 samples of data reveals that the JDC model is supported in a considerable number of studies, however the JDCS model is supported in approximately one-half of the studies (Van Der Doef & Maes, 1999). Also de Lange Taris, Kompier, Houtman & Bongers (2003) indicate in their analysis of the JDCS model that it is not unequivocally supported. Further, a study by Parker & Sprigg (1999) interestingly suggests from their study that Karesek's JDC model only works when incorporating pro-active employees.

Evidence to support Pearlin & Schoolers (1978) measure of personal mastery has also been reported within the literature. For example, Steptoe & Appels (1989) summarise that perceptions of mastery are seen as mediators between stressors that limit or facilitate control and individual work-related outcomes. Daniels & Guppy (1992b, 1994) further consider the mediating effects of control within the stress and well-being process. However, it has been proposed that an imbalance between the degree of control desired and the degree of control available may adversely result in strains (Steptoe & Appels, 1989). Regardless, there again appears to be little empirical evidence of longitudinal research measuring the effects of control within the literature, thus causality between control, demands and outcomes is difficult to infer.

2.5 Criticisms of Chapter Two

Perhaps the greatest criticism of the theories and models of control discussed within 2.2, 2.3 and 2.4 is the limited amount of empirical longitudinal research that has been performed over the years measuring the different models and theories of control within occupational stress research. However, recently a study by de Lange et al (2003) investigated the methodological quality of longitudinal research examining Karasek's model. The study used five criteria in the process of evaluation (type of design, length of time lags, quality of measures, method of analysis and non-response analysis). Out of 45 longitudinal studies, only 19 (42%) obtained acceptable scores on the five criteria. The

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Although research has been performed measuring personal mastery in both work-related and context-free domains, there doesn't appear to be any research measuring control within a distinctive/specific non-work context (i.e. home/social life etc). Furthermore, no research within the literature has attempted to examine the possible spillover effects of personal mastery across domains as well as incorporating the influence/association of stress and outcome measures across domains.

2.6 Summary of Chapter Two

Chapter Two discusses various different theories and models of control. Section 2.2 briefly describes the background to the concept of control within occupational and organizational psychology research including Rotter's (1966) locus of control theory, Karesek's JDC model and Pearlin & Schooler's (1978) perceived mastery theory.

Evaluating evidence from previous research generally supports the theories and models discussed in that all theories suggest that control plays an important role in the stress and well-being process in some form or other. However, section 2.5 outlines criticisms in the control literature in this field of research. In particular, methodological criticisms such as the limited amount of longitudinal studies performed in this area of research, absence of causality amongst variables, lack of appropriate statistical analysis used and a shortage of studies examining alternative associations amongst control, stress and outcome variables. For instance, one-way, reverse and reciprocal relationships as well as measuring variables across different domains of life.

Nonetheless, control in occupational settings do appear to have major implications for psychological functioning generally, and in particular job-related outcomes where greater levels of control is mostly related with greater outcomes. Thus, the present study shall incorporate a personal control/mastery measure into the research to examine its relationship with stress, well-being and other variables under investigation.

CHAPTER THREE: THE INFLUENCE OF INDIVIDUAL DIFFERENCES

3.1 Overview of Chapter Three

Chapter Three describes the influence of individual differences within the stress/well-being relationship. Age, gender and marital status were firstly discussed within section 3.2 (demographic characteristics) followed by a breakdown of the process negative affectivity participates in occupational health research. An evaluation and criticisms section then discusses further the issues raised above. The chapter concludes with a summary.

3.2 Demographic Characteristics

The demographic information within the following three sub-sections discuss gender, age and marital status and how these individual characteristics influence the experience of stress and well-being.

3.2.1 Gender

Numerous studies over the past years have examined the personal characteristic of gender and how this affects the experience of stressors, well-being and the use of coping strategies. For example, Nelson & Quick (1985) and Campbell & Brown (1992) discovered that workplace stressors experienced by females include adverse discrimination, stereotyping, home-work conflicting demands and low self-esteem problems. Differences in the choice of coping strategies used between men and women had also been identified. For example, a number of studies have indicated that women generally tend to use emotion-focused coping strategies, whereas men tend to make more use of problem-focused coping (Smith & Brannick, 1990, Carver, Pozo, Harris, Noriega, Scheier, Robinson, Ketcham, Moffat, & Clark, 1993). Further, Henderson, Duncan-Jones, Byrne, Adcock & Scott (1979) indicated that there are differences between the genders in regards to the availability and type of social support experienced. Men reported a greater availability of social support.

However, Parkes (1990) and Guppy & Rick (1996) note that other research has failed to produce conclusive findings in terms of a difference in the stress and/or coping process based upon gender. For instance, research has found that neither gender nor marital status affected the life stressors and coping strategies generally encountered by individuals (Thoits, 1987). Smith et al (2000) also showed that gender had little effect in the reporting of stress. Alternatively, it was suggested from the same research that it is the person's role in life which has a greater influence upon the experienced stress and coping processes, and the consequential health outcome.

3.2.2 Age

The examination of age as an influential individual difference within the stress and well-being process has been researched from two primary perspectives. Research examining how age-related experiences affect well-being such as recruitment, promotion, retirement etc concerns the first approach (Glowinkowski & Cooper, 1987 and White, 1985).

The second perspective investigates the specific influence of age within the choice of coping strategies. Findings indicate that in terms of the coping behaviours adopted younger people overall tend to exhibit problem-focused coping strategies, whereas older people generally tend to use emotion-focused coping strategies (Lazarus & Delongis, 1983 and Lazarus & Folkman, 1987).

Finding nevertheless suggest that the influence of age upon the stress, coping and well-being processes, has been subject to some recent criticism (Brown & Campbell, 1994). Therefore, the influence of age upon these psychological processes seems to require further examination.

3.2.3 Marital Status

Well-being research has been studying for a number of years the effect of marital status. A recent study by Smith et al (2000) revealed that marital status influences the reporting of stress, where widowed/divorced or separated people report higher levels of stress. Gove (1972) suggests that married women generally possess higher levels of mental illness compared to married men. Also, investigations indicate that men who are single, divorced or widowed generally have higher levels of mental illness compared to women. It would seem then that being in a relationship of some kind is more beneficial for men's well-being, whilst not being in such a relationship seems to be more beneficial for women's well-being. Pearlin and Johnson (1977) however, discovered that economic strain for both male and female's was highly related to depression.

Marital status within occupational research has been found to be a significant mediator of the stress process. For instance, studies investigating dual career relationships have indicated that an element of role conflict exists. When parental responsibilities are involved, this conflict is compounded (for example, Greenhaus & Beutell, 1985). Research has also indicated that single parents who work suffer a greater degree of mental illness compared to their single colleagues without parental responsibilities (Malley and Stewart, 1988). Marital status is commonly measured within most well-being studies in order to investigate the above mentioned findings.

3.3 Negative Affectivity

Negative affectivity was developed by Watson and Clark (1984) to describe a stable personality disposition and has been found to be consistent over time and across situations. Spielberger, Gorsuch & Lushene (1970) and Payne (1988) used the term trait anxiety to describe this variable. Negative affectivity describes the disposition for a person to perceive themselves, their environment and the interactions between the two, in an adverse or negative manner. Negative affectivity is referred to as a personality trait reflecting emotional vulnerability, pessimism and a tendency to react negatively to life and stressors.

The consequences of negative affectivity have been reported to strongly influence the association between stressors and their subsequent short and long-term outcomes. Studies have revealed that negative affectivity is a direct influential characteristic within the stress process with consistent correlations found between negative affectivity and self-reported measures of stress (for example, Watson, 1990). Parkes (1990) also revealed a significant relationship between negative affectivity and context-free well-being as well as a moderating effect. Watson (1990) suggests that people with high levels of negative affectivity are more prone to experience significant levels of distress and dissatisfaction in any given situation.

The implications for stress research indicate that negative affectivity is related with self-report measures of stress and well-being and can potentially over-estimate/increase the magnitude of association between the two. Thus, it would seem that the reporting of stress by a particular individual does not necessarily indicate that they are suffering from prolonged and/or increased stressors, rather, it may be the case that particular dispositional characteristics, allows the perception of encounters to be regarded as distressing by the individual. Researchers have therefore suggested it important within self-report stress, coping and well-being studies, to control for negative affectivity in an attempt to allow for an accurate assessment of the level of stress experienced (Brief, Burke, George, Robinson & Webster, 1988, Payne, 1988, Parkes & Von Rabenau, 1993 and Moyle, 1995). However, Payne (2000) recently put forward many reasons to argue that negative affectivity should not be controlled in researching job stress.

3.4 Evaluation of Chapter Four

Within section 3.2 the role of demographic information was put forward within the occupational health psychology research field. It would appear that gender, age and marital status discussed do have an important influence upon the stress/well-being process. However, longitudinal research once again needs to be undertaken in order to infer causal associations.

It would also seem that negative affectivity has a major influence upon stress research and hence shall be incorporated within the current research. However, a criticism of negative affectivity is that it inflates relationships between stressors and outcome variables. Watson & Pennebaker (1989) and Parkes (1990) support this concept in their investigations. More recently, research by Judge, Erez & Thoresen (2000) have supplied evidence to support negative affectivity, arguing that associations between negative affectivity, job stressors and strains are not exaggerated by negative affectivity bias. They go on to consider bias as a purely statistical process, where negative affectivity should not be considered as a nuisance factor and recommend negative affectivity as a major factor in future stress research. Chen, & Spector (1991), Burke, Brief & George (1993) and Spector, Zapf, Chen & Frese (2000) all support this view in some form or other.

3.5 Criticisms of Chapter Three

Since most studies performed in this area have been cross-sectional as opposed to longitudinal, researchers have therefore not accounted for initial responses from outcome measures to obtain a degree of control and this can result in spurious relationships between negative affectivity and affective reactions. Thus, it should be noted there are problems associated with interpreting investigations that examine the stress and well-being process in relation to negative affectivity.

Although negative affectivity is a dispositional trait and is therefore relevant within any situational context, there appears to be no evidence over the years within the literature regards the effect it has upon other variables within the stress process across work, non-work and context free domains. However, recently, Stoeva, Chiu & Greenhaus (2002) conducted a study which reported that negative affectivity indirectly affects work to family conflict through its effect on work stress and indirectly affects family to work conflict through its effect on family stress. Thus, further research in this area is needed.

3.6 Summary of Chapter Three

Within Chapter Four, the influence of individual differences within the stress research literature was discussed. Previous research conducted on the demographic characteristics of gender, age and marital status showed that they do have an important part to contribute to this field of research. The dispositional characteristic of negative affectivity within section 3.3 was also seen as having a strong influence upon the stress/well-being relationship and as a confounding control variable.

Evidence from previous research appears to be inconclusive as to the role that negative affectivity should conduct i.e. as either a major factor in stress research or a nuisance factor to be controlled. Criticisms of the individual differences research performed in relation to stress research over the years is again mainly methodological as well as issues concerning the relationship with other variables across domains within the stress literature.

CHAPTER FOUR: THEORIES & MODELS OF WORK PERFORMANCE

4.1 Overview of Chapter Four

The current chapter discusses work performance and its relation within the stress/well-being process. Since there seems to be no single specific work performance model within the literature, the format of the current chapter shall be different to that of others in SECTON A in that no models will be outlined and followed by two sections evaluating and criticising issues raised. Instead, Chapter Four shall be in the form of a literature review followed by a brief summary of theories discussed.

4.2 Theories of Work Performance

Job performance can be defined as to whether individuals at work behave and contribute to the organization they work for. Daniels & Harris (2000) consider there to be two components of performance at work: role performance (behaviours required by an individual to fulfil their work role specified in the employees job description) and non-role performance (behaviours that contribute to the attainment of the organization or extra-role bahaviours such as helping colleagues and not complaining about trivial issues). Daniels & Harris (2000) also go on to state that there are two approaches in researching associations between well-being and performance. Firstly, the direct role of psychological well-being and work performance, and secondly, work performance as a consequence of stress which is assumed to be related to negative well-being.

Jex (1998) revealed that the association between work stressors (interpersonal conflict) and performance are not particularly strong. However, for particular job conditions there is some evidence of a relationship with performance. A most recent study by Hosie (2003) showed that affective well-being significantly predicts work performance as well as positive affective well-being being related to enhanced work performance. However, it should be noted that this study incorporated measures of supervisor-ratings of the evaluation of managers' work performance. Jex (1998) also discovered that workload has both a positive and negative relationship with performance (the current research shall measure workload and work performance). However, some research has suggested there to be no association between outcomes and work performance (Vroom, 1964, Locke, 1976 and Iaffaldano & Muchinsky, 1985). For example, Iaffaldano & Muchinsky (1985) found an average correlation of 0.17 between variables in their meta-analysis. The authors also show a correlation of –0.10 for a sample of nurses measuring stress and performance. Steen, Firth & Bind (1998) showed in their study of nurse's only one significant relationship between work performance and well-being outcome measures out of four performance measures.

Previous research has also been performed measuring well-being and job performance longitudinally. Results from Wright, Bonett & Sweeney (1993) from a two-year longitudinal study showed a positive association between well-being and job performance. This study was reported as being the first formal investigation measuring mental health as a predictor of subsequent work performance. However, it should be noted that the study incorporated a small sample size of only 33 so therefore results should be interpreted cautiously. Wright & Bonett (1997) found similar results in their research. Staw, Sutton & Pelled (1994) showed that high levels of employee well-being was significantly related with work performance. More recently, two longitudinal studies conducted by Wright & Staw (1999) signified that well-being was significantly associated with job performance. Thus, it would appear that the evidence is strong to suggest that well-being is significantly related with performance, nonetheless, the number of studies is limited

Cotton's (1993) review suggested that workplace control has a positive affect on performance. Research would seem to suggest that both work stress and work control influence work performance. Mughal, Walsh & Wilding (1996) report in their study that individual differences measures of trait anxiety exert greater effort than low effort in producing better work performance.

Although there is little evidence of research examining the relationship between workplace stress, non-work stress, psychological well-being and work performance, an interesting and most recent study by Van Dyne, Jehn & Cummings (2002) performed an investigation measuring these associations. Interestingly, findings indicate a positive relationship between workplace stress and work performance and a negative association between non-work stress and work performance. The authors go on to suggest that this type of research has both theoretical and practical implications in that employees fill multiple roles in life.

4.3 Summary of Chapter Four

It would appear that there is evidence to support the claim that well-being is associated with job performance. However, evidence of a causal path between workplace stress and job performance is less convincing. It seems that better designed research is required to investigate specific models of well-being and performance. For example, research in the future should be conducted that examine job conditions, work performance and well-being over short periods of time. However, it should be noted that no studies mentioned in section 4.1 have used employee self-reports of performance like within the present research. Rather those studies have incorporated sales figures or supervisor ratings to indicate work performance.

CHAPTER FIVE: RATIONALE FOR THE CURRENT RESEARCH

5.1 Overview of Chapter Five

Chapter Five begins by drawing together the main issues raised from the literature presented within Chapters One-Four. This is only a brief review as the previous chapters contained within them an evaluation and criticisms section which summarised theories. Section 5.3 expands on this theme by discussing the limitations within existing research whilst raising main research questions emanating from the literature in regards to the complex interrelationships between the variables measured within the present research. This theme was extended to consider interrelationships between variables across different domains of life. A proposed model is then put forward to accompany the theoretical ideas discussed so far and to act as a baseline model. A methodology section discussing longitudinal design, structural equation modeling and multi-sample design was also put forward (methodological issues, all of which are incorporated within the current research). The aims of the current research are then outlined followed by a series of research hypothesis to be addressed. The chapter is concluded in section 5.8.

5.2 Summary of SECTION A: INTRODUCTION/LITERATURE REVIEW (Chapters One–Four)

Chapters One-Four basically discuss stress and well-being models including the role that control, individual differences and work performance play in the process.

Chapter Five: Rationale for the Current Research

Chapter One firstly notes the extent of the problem concerning stress within organisations and the extensive cost to economies. Transactional models of stress were reviewed which focus upon the interaction between the person and the environment.

Cooper's (1986) four level multi-component model was then put forward which emphasises the interaction between stress, individual differences, symptoms of occupational ill health and disease. Cooper's model contains the basic components of the stress process. Nonetheless, it was argued that the model is too inflexible in its basic left to right causal directions between variables. However, Warr's (1987) model of occupational stress notes the importance of an individuals mental health and distinguishes between work, non-work and context-free domains of life. Warr's (1987) Vitamin model indicates that nine factors have the capacity to influence an individual's well-being. Warr's model also considers competence, aspiration and negative carry-over as other aspects of mental health. Chapter One's evaluation of Warr's (1987) model appeared to provide a substantial insight into the understanding of occupational stress. Criticisms of both Cooper's (1986) and Warr's (1987) model concerns the issue of causality. It was considered that Warr's model did not provide a concise interpretation of any reverse or reciprocal causal associations between job characteristics and mental health as well as the interrelationships between stressors and well-being across different domains of life. Figure 1.8 within Chapter One shows the causal pathways previously studies within the literature between stress and well-being whilst Figure 1.9 summarises the causal pathways between stress and well-being still outstanding within previous research.

Chapter One then rounds off with a brief discussion of research conducted studying the relationship between stress and well-being in university staff, working/non-working students and trainee nurses samples respectively. An evaluation of the research conducted incorporating these three specific groups of participants revealed inconsistent findings.

Chapter Two within SECTION A then explored theories and models of control. This chapter starts out by investigating the background literature concerning control within organizational stress research and then goes on to primarily outline Karesek's JDC model and Pearlin & Schooler's (1978) perceived mastery theory.

This is followed by an evaluation of the control models described, which generally support the models outlined where control plays an influential part within the stress/well-being process. Criticisms within the control literature are mainly methodological. For example, again there appears to be a limited amount of longitudinal research conducted (and therefore an absence of causal relationships between other associated variables such as stress, coping and well-being). There also seems to be a shortage of appropriate statistical techniques incorporated within the control literature such as structural equation modeling (and therefore limited evidence of one-way, reverse and reciprocal relationships). Research also tends not to test variables across different domains of life.

Overall, however, the review within Chapter Two considered control within the workplace to play an important role in relation to an individuals' psychological well-being. For example, greater levels of control is mostly related with greater outcomes.

Within Chapter Three of the INTRODUCTION/LITERATURE REVIEW, the effect that individual differences have upon the stress process was explored. Research performed within the literature on gender, age and marital status found that these characteristics have a central contribute to play within organisational stress research. Negative affectivity was also discussed within section 3.3 of Chapter Four. This variable was considered to have a major impact upon the stress/well-being process.

However, previous research seems to be inconsistent as to the effect that negative affectivity has upon stress research. For example, is has been suggested that negative affectivity inflates associations between stressors and outcome variables and that it acts as a nuisance variable that should be controlled. On the other hand, negative affectivity has been considered a major factor in stress research. Methodological inadequacies prevalent within studies measuring individual difference variables within the stress/well-being research was yet again referred to as well as concerns regarding the association with other variables across different life contexts.

Finally, SECTION A reviewed theories and models of work performance within Chapter Four. Research seems to support the claim that well-being is associated with work performance. Evidence of causal associations between occupational stress and work performance is less convincing. It was suggested that future research should be performed that simultaneously measures workplace stress, work performance and well-being longitudinally to assess interrelationships amongst variables. The review also pointed out methodological deficiencies within job performance investigations in that previous studies do not measure employee self-reports of performance like in the present study.

5.3 Interrelationships Amongst Variables Measured in the Current Research

Based upon the summary of the INTRODUCTION/LITERATURE REVIEW within the previous section (5.2), the following section shall prepare a number of important research questions/issues to be considered within the present study which previous research has failed to address. Refer to the evaluation and criticisms sections within Chapters One-Four which discuss these issues in more depth. Sections 5.3 and 5.4 shall discuss these issues in chronological variable order like in SECTION A (i.e. stress and well-being, control, individual differences and work performance respectively).

Firstly, both Cooper's (1986) and Warr's (1987) models fail to provide a clear indication of reverse or reciprocal associations between stress and well-being at work. For example, the possibility that well-being predicts stress and that stress and well-being mutually influence one another. Demonstrating causality between occupational stress and psychological well-being is important from a theoretical standpoint as there appears to be conflicting views about the causal direction of the associations. For example, the assumed causal flow according to the Demand-Control-Support Model (Karasek & Theorell, 1990) is that stress effects well-being. However, the drift-hypothesis (Frese,

1982) suggests that there are considerable arguments to suggest that well-being effects stress. For example, Daniels and Guppy (1993) found that decreases in well-being lead to increases in self-report frequency of occupational stress. Zapf et al (1996) revealed that out of 16 studies on organizational stress that tested for reversed causation, only six produced significant findings to suggest reversed causation.

Alternatively, transactional models of stress (Edwards, 1992) consider that stress and well-being are reciprocally caused (i.e. Occupational stress and psychological well-being mutually influence each other). Nonetheless, reciprocal causation has been scarce in organisational stress research (James & Jones, 1989 in Zapf et al, 1996). This is most probably partly due to the limited amount of longitudinal studies in this field (i.e. longitudinal design is necessary in order to test reciprocal relationships). There have only been a hand-full of longitudinal studies that indicate a reciprocal relationship between stress and well-being (James & Jones, 1980, Bateman & Strasser, 1983, Kohn & Schooler, 1982, James & Tetrick, 1986, Schwarzer, Hohn & Jerusalem, 1993 and Taris, Bok & Calje, 1998). Zapf et al (1996) refers to this association as "some sort of vicious circle, which does not correspond entirely to the nature of most social and psychological systems." Zapf et al (1996) goes on to suggest that future research into more complex models of the associations between occupational stress and psychological well-being, including reciprocal associations, should be investigated.

Lawler (1968) first attempted to examine the reciprocal causal relationships between expectancy model constructs and employee performance using a longitudinal panel design. Since then only 27 longitudinal studies designed to investigate reciprocal relationships have been undertaken, which seems strange when considering the techniques promise (Williams & Podsakoff, 1989). Zapf et al (1996) summarises a number of these studies. For example, a study by Kohn and Schooler (1982) revealed a dynamic system in that oppressive working conditions effect personality and in turn that personality has important consequences for an individual's place in the job structure (i.e. working conditions effect personalities and personalities effect working conditions). Moreover, this appears to be the only study that tested cross-lagged and cross-sectional effects, controlled for third variables and tested reversed and reciprocal causation (Zapf et al, 1996).

However, Marcelissen, Winnubst, Buunk and de Wolf (1988) found that there were only three of 16 causal effects of supervisor support upon strains, but no reversed effects. Further, there were no effects of co-worker support upon any strain variables, but five of 16 reversed causal effects were found. No reciprocal effects were found. Moreover, no cross-lagged effects were tested or third variables controlled. The study did however use a three-wave design to test reciprocal effects. Schonfeld (1992) investigated the relationship between stressors and depressive systems and found that these variables were related. However, there were no significant reversed effects or reciprocal effects. Also, the investigation didn't incorporate third variables.

The findings from the above studies have been selected due to their high degree of methodological rigour and therefore one can be more confident of the results produced. Nevertheless, there still remain inconsistencies in the findings.

Similarly, although the literature suggests that control at work plays an influential part within the stress/well-being process (Karasek, 1979 and Daniels & Guppy, 1997), models of control fail to clearly indicate a consistent causal pathway amongst the stress, well-being and control variables. Previous results fail to incorporate sufficient methodological rigour to examine potentially complex relationships amongst variables such as incorporating longitudinal design and adequate statistical techniques like structural equation modeling.

It would seem that in order to measure associations between numerous variables within the stress/well-being process accurately, negative affectivity is perhaps best controlled for during analysis in order to prevent causal relationships between variables being exaggerated. For example, research suggests that individual differences variables can exert an effect upon the experiences of stress (Brown & Harris, 1978, Cohen & Wills, 1985 and Nelson & Quick, 1985) and upon outcome measures (House, 1981, Sorenson, Pechacek & Pollenen, 1986 and Moyle, 1997).

Another important variable appropriate for future research observed within the literature review is work performance. Yet again, although work performance would seem to be associated with well-being and to some extent stress at work, there does not appear to be any specific clear role that performance plays within the stress process. For instance, the causal pathways between stressors, well-being and performance at work that indicate one-way, reverse and two-way relationships.

5.3.1 Measuring Variables Across Domains

Warr (1987) put forward within his model of well-being the idea that work, non-work and context-free domains of life are important features within the stress/well-being process. This concept has also been elaborated by other authors since (for instance, Edwards & Rothbard, 1999 and Hart, 1999). See also Chapter One, section 1.5 (especially sub-section 1.5.4, 1.5.5 and 1.5.6). Figure 1.8 represents previous research that has provided consistent evidence of causal associations between stress and well-being variables across work, non-work and context-free domains. Figure 1.9 however, reflects the causal pathways between the same variables that have not been examined or have produced inconsistent results within previous research. It would seem that the complex interrelationship between stress and well-being across domains (especially reverse and reciprocal relationships) requires further examination in an attempt to unravel the causal associations between variables across domains.

Within the criticisms section of Chapter Two (section 2.5) it was observed that evidence from previous research did not provide an adequate assessment of the complex relationship that control plays within the stress/well-being process across different domains of life. Taking into account the review of individual differences within the literature discussed within previous chapters, there appears to be limited research measuring the effect that negative affectivity has upon the stress process whilst measuring variables across domains. Although job performance is obviously measured within a workplace context, where associations between job stress and well-being have been investigated, nevertheless, more intricate and complex relationships between work performance and other variables such as stress and well-being, across work, non-work and context-free domains of life is not evident.

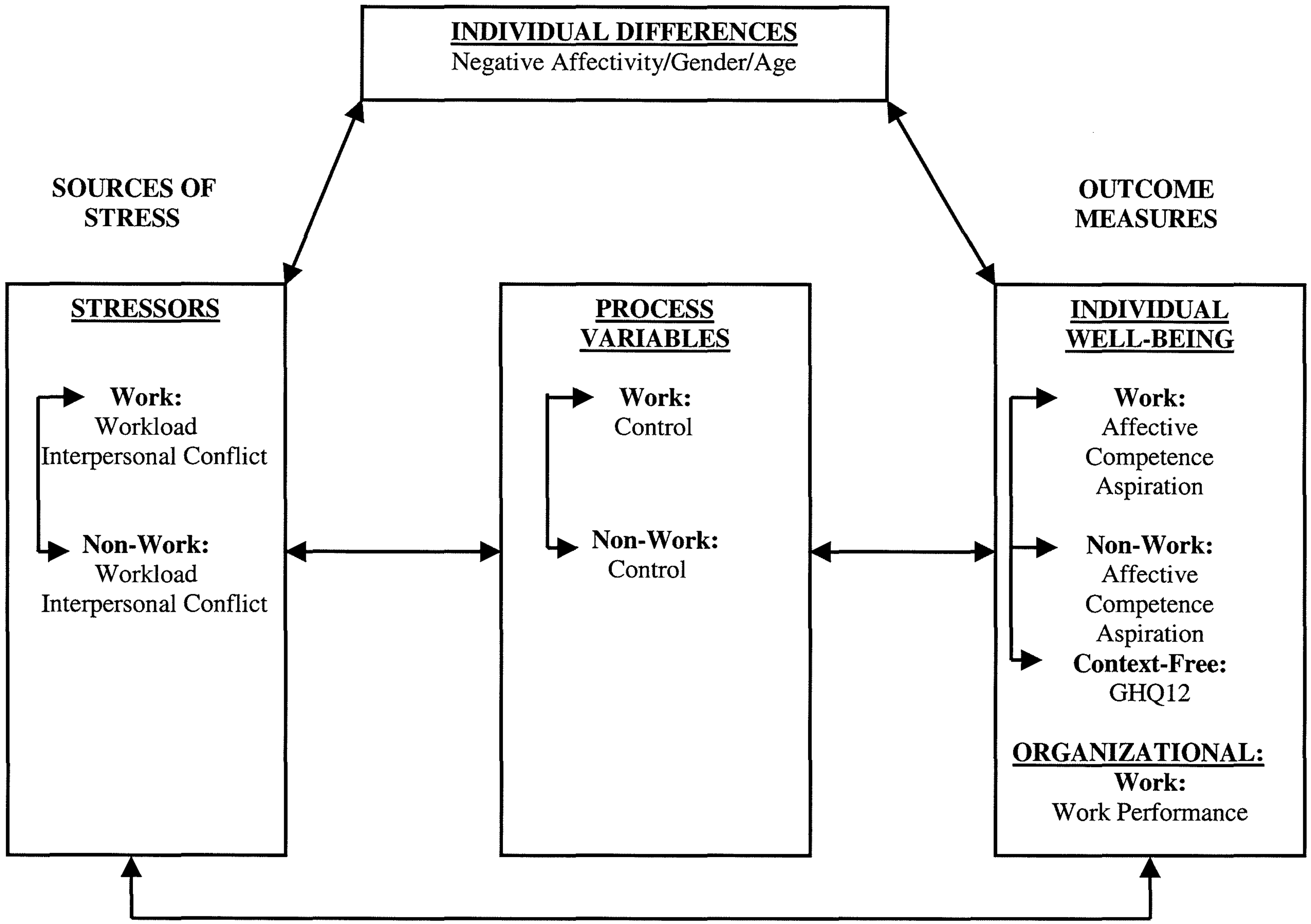
To sum up sections 5.3 and 5.3.1, it would appear then within the literature that previous research fails to address potentially more complex and intricate causal pathways between variables measured within the present study. For example, one-way, reverse and reciprocal associations between stress, well-being, control, individual differences and work performance across work, non-work and context-free domains of life (section 5.4 shall provide a proposed theoretical model of associations between the variables measured within the current research).

5.4 Proposed Theoretical Model

Figure 1.10 represents only a basic simplified working model of the potentially complex interrelationships amongst variables within the transactional stress/well-being process. The model acts as a theoretical foundation model or starting point at which to address particular issues raised throughout Chapter Five, especially section 5.3. The proposed model is purely theoretically driven in parts based upon a common-sense approach due to the fact that there appears to be no previous research studying particular relationships in the model to direct theory. The proposed model attempts to address and maintain both consistently researched causal relationships between variables within the literature (for example see Figure 1.8) as well as causal relationships that have produced inconsistent evidence over the years and associations not yet investigated (for example see Figure 1.9).

The three columns within Figure 1.10 represent the three stage process within transactional models of stress. For example, the left-hand side column reflects sources of stress, the middle column shows the mediating process variables involved and the right-hand side column represents outcome variables. Within each column, variables are considered across work, non-work and context-free domains of life. Double-headed

Figure 1.10: Proposed Transactional Model of the Stress/Well-Being Process



arrows represent the potential presence of reciprocal relationships between concepts and can be considered across columns and within columns (domains). However, these associations could theoretically be alternatively only one-way or reverse relationships. All variables within the proposed model (Figure 1.10) have been measured within the current study so that all concepts can be analysed.

5.5 Methodology

The following sub-sections within section 5.5 address methodological issues directly related to the research design within the current study.

5.5.1 Longitudinal Design

Only limited research has been undertaken using longitudinal methodology design in the field of stress research, a design that attempts to overcome the methodological deficiencies that are apparent in cross-sectional studies. For example, longitudinal studies attempt to solve the problems associated with cross-sectional studies, such as the problem of reverse causation and the effect of third variables (Zapf et al, 1996 and de Lange et al, 2003). Although causal inferences cannot be proven in longitudinal data (Holland, 1986), they can be made plausible by excluding reversed causal relationships and controlling for third variables such as occasion factors, background variables and non-constant variables (Zapf et al, 1996). The use of longitudinal research designs has nonetheless been recommended within occupational stress research (Lazarus, 1981, Parkes et al, 1994 Colvin et al, 1995 and Hart et al, 1995).

Chapter Five: Rationale for the Current Research

According to Zapf et al, (1996) only 43 longitudinal reports on organisational stress were identified out of hundreds of publications regardless of the advantages gained using this design and suggests the need for further longitudinal studies in occupational stress research.

Thus, one main aim of this study is an attempt to address the many methodological issues associated with longitudinal research in this field.

Zapf et al (1996) rounds up a review of longitudinal studies in organizational stress research by suggesting recommendations in regards to methodology: (1) In order to test reverse or reciprocal causation, all variables should be measured at all time points using the same measurement method. (2) Third variables should be controlled for as potential confounders. (3) The time lag should ideally be planned. (4) Consideration for the time course should be examined (i.e. particular studies may find it beneficial to study participants beginning their jobs, whereas other studies may not). (5) Structural equation modeling is suggested as the best analytic approach. (6) Errors in measurement should be accounted for by the examination of measurement models. (7) Multiple competing models should be tested (i.e. reversed and reciprocal causation).

The present study upholds all the above mentioned recommendations for longitudinal stress research. For instance, the same variables (scales) are measured at all time points for all samples, individual differences variables are controlled where necessary (i.e. negative affectivity), the time lags were somewhat planned, consideration for the time of the study was thought through but not considered of primary importance, structural equation modeling is incorporated as the chosen analytic approach, measurement models are tested via confirmatory factor analysis and different model are examined for one-way, reverse and reciprocal associations.

5.5.2 Structural Equation Modeling

Structural Equation Modeling (SEM) also known as LISREL (Joreskog & Sorbom, 1993) is an accumulation of statistical techniques that allow analysis of a set of associations between one or more independent variables and one or more dependant variables (Tabachnick & Fidell, 1996). The variables can be either latent factors or measured observed variables. There are two important aspects to SEM. One aspect is confirmatory factor analysis (theoretically driven approach), that examines a particular measurement model. The other is the structural model causal processes which are represented by a series of regression equations that can be represented pictorially in order to show the conceptualisation of the theory. Models are examined statistically in a simultaneous test of all variables within the model to determine the extent to which the model under investigation is consistent with the data. Goodness of fit statistics are examined to measure the fit.

SEM is also referred to as causal modeling, causal analysis, path analysis, simultaneous equation modeling and covariance structures and can be used by software statistical packages such as AMOS, LISREL and EQS.

Fornell (1982) considers that SEM has several aspects that set it apart from the older generation of multivariate approaches. Firstly for instance, as mentioned earlier, SEM takes confirmatory factor analysis (CFA), an alternative approach to exploratory factor analysis which is statistically driven. Secondly, SEM is useful for theoretically driven inferential purposes as it allows hypothesis testing. Thirdly, unlike traditional multivariate approaches that ignore error that can lead to major inaccuracies, SEM is capable of assessing and correcting for measurement error via error variance parameters when testing causal relationships between latent constructs. Fourthly, SEM allows analysis of both observed variables and unobserved latent variables. Zapf et al (1996) and more recently de Lange et al (2003) elaborate on the advantages of using SEM over other statistical techniques. For example, reciprocal associations can be examined and third variable problems can be accounted for. These highly desirable characteristics have made SEM a popular and attractive methodology for non-experimental survey research (Bentler, 1980).

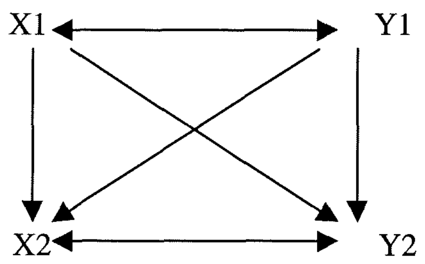
Zapf et al (1996) also argues that (SEM) is the best technique to analyse longitudinal stress research. For example, causal effects, including reversed and reciprocal causation, can be examined using SEM as well as considering third variable effects. However, Zapf et al (1996) noted that out of the 43 longitudinal studies only 10 used SEM. SEM also allows researchers to constrain parameters amongst variables which is very useful when using longitudinal data (Bijleveld, Mooijaart, Kamp & van der Kloot, 1998). For example, two repeated variables the same at x1 and x2 measured at two different time points within a model can be constrained within SEM to the same value. It makes sense to assume that the same variable measured at time one reflects the variable at time two and does not have a different interpretation. This is also possible for error terms across time points when using SEM.

5.5.2.1 Cross-Lagged Structural Equation Modeling

It is also worth noting two-wave cross-lagged panel designed models, as this analytic technique shall be used within the present studies results section.

One of the major statistical procedures used in this study is cross-lagged analysis (Campbell & Stanley, 1963), a technique used to examine causal pathways amongst particular variables whilst using longitudinal data (also referred to as nonrecursive multidirectional path models; Maruyama, 1998). The cross-lagged regression model is especially applicable to data in which measurements have been made on the same sample and the same variables at two different time points such as the present study. Cross-lagged analysis consists of six correlations: cross-sectional correlations at time 1 and 2 r(X1, Y1) and r(X2, Y2), autocorrelations r(X1, X2) and r(Y1, Y2) and the cross-lagged correlations r(X1, Y2) and (Y1, X2). See Figure 1.13. The core element of the technique is the correlations of r(X1, Y2) and r(Y1, X2) which attempts to determine the causal predominance of either of the variables.

Figure 1.11: Two-Wave Cross-Lagged Effects



Cross-Lagged SEM shall be estimated within the current research to identify one-way, reverse and reciprocal causal relationships between variables over time. SEM is particularly suited to cross-lagged analytic problems (Bentler & Speckart, 1981, Brown, 1990 and Kerwin, Howard, Maxwell & Borowski, 1987). See De Jonge et al (2001) as a good example of this statistical technique measuring occupational stress and psychological well-being as well as Hays, Marshall, Wang & Sherbourne (1994).

It would appear that use of cross-lagged SEM within the current study is appropriate and fitting. A thorough description of the SEM analytic procedure shall be discussed step by step within Chapter Thirteen.

5.5.3 Multi-Sample Design

Since the current study incorporates more than one sample of data, it is possible to replicate analysis of the data to address the issue of cross-validation in order to strengthen findings.

SEM analysis allows the estimation of models across multiple groups of data. For example, analysis is performed to determine whether the data from two or more samples fits the same hypothesised model and that the groups are drawn from the same population. Vandenberg and Lance (2000) state the importance of performing measurement invariance across groups and note that this statistical technique is rarely conducted in organizational research. The importance and strength of replication and cross-validation was put forward in a statement by Steiger (1990). "An ounce of replication is worth a ton of inferential statistics (pp. 176).

5.6 The Aims & Objectives of the Current Research

The current research attempts to encompass and explore a number of concepts raised within Chapter Five from section 5.2-5.5. For example, the present research shall expand on the current state of knowledge relating to the causal relationship between psychological well-being, stress, control, individual differences and work performance. Relationships between these variables will be explored across work, non-work and context-free domains of life where appropriate. Thus, the present study attempts to address the myriad of inconsistent findings within the literature from previous research in relation to the interrelationships between variables based upon the proposed theoretical model shown in Figure 1.10.

This study has also been designed to address some methodological pitfalls and deficiencies associated with stress research. For example, since cross-sectional studies have been identified as limiting, longitudinal design shall be used in order to identify causal pathways between variables. SEM shall also be incorporated as a strong and appropriate analytic technique as well as the use of multi-group data from three samples to cross-validate and further strengthen findings.

5.7 Research Hypothesis

Based upon the information discussed within Chapter Five from sections 5.2-5.6, a group of hypothesis have been developed that address the main issues of concern. The following hypothesis shall be tested longitudinally over time and across two samples of data.

H1: There is a reciprocal relationship between stress and well-being in the workplace, non-work and context-free domains of life.

Both stress influences well-being as well as well-being influences stress. The reciprocal relationship between the two variables will be consistent across the three domains of life as depicted in Figure 1.9 and Figure 1.10.

H2: There is a reciprocal relationship between stress, control and well-being in the workplace, non-work and context-free domains of life.

Stress influences control as well as control influences stress. Control influences well-being as well as well-being influences control. The reciprocal relationship amongst the three variables will be consistent across the three domains of life as depicted in Figure 1.10.

H3: There is a reciprocal relationship between stress, work performance and well-being in the workplace, non-work and context-free domains of life where appropriate.

Stress influences work performance as well as work performance influences stress. Work performance influences well-being as well as well-being influences work performance. The reciprocal relationship amongst the three variables will be consistent as depicted in Figure 1.10.

A subsidiary hypothesis that is relevant to the above Hypothesis One is:

Negative affectivity exerts an exaggerated influence upon the experience of stress and well-being.

Negative affectivity shall therefore be controlled for as a third variable within Hypothesis One.

Thus, a sequence of appropriate structural equation models will be conducted addressing each individual hypothesis with an emphasis on variables being tested across multi-domains. Numerous authors have used this procedure (e.g. De Jonge et al, 2002). It should be noted that all four hypotheses may appear to be somewhat vague and unclear at this stage, this is however due to the complexity of the hypothesis put forward considering the number of variables and life domains involved. Throughout Chapter Thirteen SEM theoretical models will be drawn up to make the hypothesis more clearer.

5.8 Summary of Chapter Six

Chapter Five provided a summary of the literature reviewed in the previous four chapters followed by an argument outlining the main limitations within the literature. Based upon the literature discussed, a list of important outstanding research questions were considered regards the interrelationship between variables within the present study. A proposed theoretical working model was designed that attempted to encompass the ideas drawn from the analysis of the literature review and also to reflect the series of hypothesis put forward that shall be investigated within the forthcoming statistical analysis in the results section. A discussion of the methodology incorporated within the current research and the justification for its use was also argued which covered longitudinal design, structural equation modeling and multi-sample design. The aims of the current research were then outlined. Three research hypothesis were finally described.

SECTION B: METHODOLOGY

SECTION B discusses the methodology used within the current research. Firstly, Chapter Six outlines the design of the study followed by Chapter Seven that describes the three samples that are incorporated within the research. This is followed by Chapter Eight, which provides an in-depth analysis of all the measures used within the two questionnaires designed for the present study for both the university staff and the working/non-working students and trainee nurses samples. Chapter Eight also discusses the two questionnaire designs and the pilot study. The procedure undertaken to conduct the present research is outlined within Chapter Nine. Finally, Chapter ten concludes the methodology that has been incorporated for this study by underlining the complex structural equation modeling analytic procedure that is to be conducted within SECTION C (Results).

CHAPTER SIX: DESIGN

A longitudinal repeated measures design was adopted for all three samples of data collected within the current research. The rationale for this design was discussed in detail within Chapter Five (5.5 Methodology). This studies design is based upon the recommendations of a number of authors (for example, Zapf et al, 1996 and Hart et al, 1995) and appears to overcome a number of methodological problems associated with cross-sectional designs. Longitudinal studies allow for the identification of third variables and also allow for the use of various statistical techniques to test the causal relationship between variables being measured (Zapf, et al, 1996). Participants supplied data for all measures via self-report questionnaires.

CHAPTER SEVEN: PARTICIPANTS

7.1 Overview of Chapter Seven

Chapter Seven provides information regards the three samples used within the present research. Firstly an outline the first sample used shall be discussed (university staff), followed by the second (working and non-working students) and the third (trainee nurses). It should be noted that this chapter only presents a brief outline of the three groups used within this study since sampling techniques shall be discussed within Chapter Nine. Also, demographic information such as gender, age and programme of study etc will be reported within the results section.

7.2 University Staff

The first sample within this study comprises of members of staff employed at a university in South East England within the UK. The intended sample is similar to the sample in the study performed by Kinman (1998). Participants job titles consist of academic, administrative/clerical, management, manual and technical. Two thousand employees were initially approached to complete the questionnaire. Sample sizes from the questionnaire responses at time point one was 269 (13.4% response rate), time point two 123 (drop-out rate of 54%) and time point three 73 (drop-out rate of 41%).

Concerns are often expressed regards the value of studies that incorporate student samples, however the reasons for this choice within the present study are put forward and are comparable to issues raised in studies performed by other authors (Wardle & Steptoe, 1991). For example, the questionnaire was designed to address issues of work whilst attending university and therefore specifically measures a students work environment. Students represent a homogeneous and easily identifiable sample. In many countries students also represent a significant position in public life and therefore reflect common patterns of behaviour and beliefs. Distribution of the questionnaire to students ensured a high response rate (Wardle & Steptoe, 1991). Also the current study measures two alternative sample to cross-validate finding.

7.3 Working & Non-Working Students

The second sample incorporated within the present research comprises both working and non-working students from the same university within the UK as the university staff sample. Programmes of study, year of study and campus varies across the sample. Three thousand students were initially approached to complete the questionnaire. Response rates from the questionnaire for time one and three was 781 (26% response rate) and 169 respectively (drop-out rate of 78%).

7.4 Trainee Nurses

A cohort of first year trainee nursing students whilst on placement consisted of the third sample. All nurses also were registered as students at the same university as samples one and two above. Nurses who participated undertook both practical aspects of work whilst on hospital ward placement and studied academically at university as part of their course. Programmes of study were generally Diploma in Higher Education (Dip H.E. Nursing) and BSc Nursing. Thus, this sample of participants could also be categorised as working students, rather than simply students. Samples used are similar to that of Rhead (1995) and Jones & Johnston (1997). One thousand nurses were initially approached to complete the questionnaire. Sample size at time point one was 454 (45% response rate) and follow-up at time point two was 75 (drop-out rate of 83%).

7.5 Summary of Chapter Seven

Chapter Seven described the three samples that have been incorporated within the current research: university staff, working and non-working students and trainee nurses respectively. The reason for selecting these three separate groups of participants within a higher education institution was to enable comparisons of findings.

CHAPTER EIGHT: QUESTIONNAIRE MEASURES

8.1 Overview of Chapter Eight

Chapter Eight presents an in-depth description of the two questionnaires incorporate within the current research. One questionnaire was designed for the university staff employee's sample and the other for the pooled working/non-working students and trainee nurses' sample. Firstly, a discussion on how the questionnaires were designed, how they both differ and the rationale for their content. Secondly, section 8.3 provides information regarding the pilot study undertaken prior to the design and administration and the final questionnaire, including its purpose and the results derived. Thirdly, the analytic procedure to be undertaken within the following sections (8.5 and 8.6) to examine the psychometric properties of the two questionnaires in this research is put forward and justified accordingly. This is followed by an in-depth evaluation of all the scales used within both the questionnaires. The chapter will conclude with a summary of its content.

8.2 Questionnaire Design

Two self-completed questionnaires were developed as research instruments for the present investigation. Questionnaire one was devised for sample one (university staff) and questionnaire two for samples two and three (working/non-working students and trainee nurses). Although the two questionnaires vary somewhat in their content, they nevertheless were designed to be very similar to allow the opportunity for comparisons across the samples. Both questionnaires remained identical across distribution time points. Self-completed questionnaires appear to be the most appropriate method of data collection. For instance, questionnaires provide anonymity for participants and also allow for powerful quantitative analysis.

The questionnaires were designed to incorporate a broad range of variables considered important within the stress/well-being process. The questionnaires primarily consist of pre-published, previously used scales that were identified as being the most suitable for the current study. The scales were decided upon by conducting an in-depth evaluation of a wide range of purported measures of stress, well-being and mediating process variables. The scales internal reliabilities, validity and overall strengths and weaknesses were taken into consideration when assessing each measure. Generally, the minimum number of items representing each individual scale was adopted, thus ensuring that the questionnaires were as short and easy to complete as possible for the participants in as attempt to encourage response rates. The questionnaires require approximately 15 minutes to complete. The length, format and overall design of the two questionnaires was considered important since all samples of data were longitudinal i.e. the questionnaires would hopefully be completed more than once so therefore had to be designed to encourage completion.

An accompanying introductory covering letter was presented on the front page of both questionnaires at all time points. Appendix 2.1 provides the three different covering letters for the associated time points the questionnaires was distributed to the university staff sample respectively. The first covering letter disclosed the name of the researcher conducting the project (myself) and a basic outline of the studies purpose. This is followed by statements explaining that involvement in the study is voluntary, confidential and a request for respondents to further participate in the study at a later date by completing additional questionnaires. Details of how and where to return the questionnaire was also stated (further information on how the questionnaires were distributed and returned will be discussed within Chapter Nine). Request of signature was finally stated to consent to agree to participate in the study. The second and third covering letters distributed at time phases two and three basically follow what was outlined in the baseline letter, however further encouraging participants to complete additional questionnaires. No further request for consent was requested. Appendix 2.2 shows the two covering letters for both the working/non-working students and the trainee nurse's questionnaire at time phases one and two respectively. The content of the letter is similar to that of the university staff sample. However, both request information regards students number and their programme of study.

Both questionnaires comprise three main sections. The three sections for the university staff questionnaire are 'Your Working Life', 'Your Non-Working Life' and 'General'. Your working life (section 1) measures aspects of stress, well-being, control, performance and coping at work. Section 2 generally measures the same variables as section 1, however within a non-working life domain. Section 3 (general) again represents variables within the stress/well-being process also provided in sections 1 and 2, but however within a context-free life domain. This section also measures individual differences and general demographic information about the respondents. See Appendix 2.3 for a copy of the university staff questionnaire.

The three sections representing the working/non-working students and trainee nurse's questionnaire are generally the same in format and content to the university staff questionnaire. These three sections are 'Your University Working Life, 'Your Social Life' and 'General' respectively. The variables measured within each section represent variables considered important within the stress and well-being process. Appendix 2.4 provides a copy of the student and nurses questionnaire.

Section 8.5 and 8.6 will provide a detailed description of all the measures incorporated within the current research across all three sections of both questionnaires.

It should be noted that not all the scales within both questionnaires shall be reported, analysed or discussed within this study. For example, within the university staff questionnaire across all three sections, both primary and secondary appraisal shall not be reported. Within the working/non-working students and trainee nurses' questionnaire, both primary and secondary appraisal will not be discussed within section 1 and section 3 and the emotional intelligence scale in section 3. The rationale for this decision is due to the fact that the current study is measuring so many variables, across three domains, with three samples of data incorporating longitudinal design; therefore word count limitations restrict the reporting of all potential analysis. Thus, it is unfortunately suggested that particular variables of less interest within the research would have to be removed from the analysis in order to meet word count deadlines. However, further analysis in the future shall be performed with the removed measures.

Thus, the focus on the current research is to perform an in-depth analysis on a selected number of important variables.

8.3 Pilot Study

A pilot study was conducted before the final design and distribution of the questionnaires to the first sample of university staff employees. The purpose of the study was to confirm whether particular scales selected for distribution were psychometrically adequate via reliability analysis. Although the scales that were intended for use are previously used standardised measures, the present study intended to slightly re-design/reduce the scale items or alter the frame of reference (i.e. paraphrase scale instructions). Thus, hard copies of the pilot questionnaire were distributed to 37 university students. The questionnaires accompanying covering notes outlined the aims of the study. See Appendix 2.5 for an example of the pilot questionnaire.

The first scale was taken from Carver et al's (1989) COPE scale measuring social support at work. Three items from each of the seeking social support for instrumental reasons and seeking social support for emotional reasons were selected on the basis of the highest factor loadings as requested by Carver et al (1989). The reason for piloting this scale is to examine whether the two scales have adequate internal consistency. The second scale within the questionnaire is identical to the first, however, the two social support scales are this time measured within a non-work context which Carver and Colleagues (1989) never measured in their investigation. Findings indicate that a two-item solution for both social support scales across both work and non-work domains was preferable to a three-item scale. Items 3 and 5 were selected for the social support for instrumental reasons scale and items 2 and 6 for the social support for emotional reasons scale. Cronbach's alpha coefficients were .75 and .80 for the work-related social support for instrumental reasons and social support for emotional reasons measures respectively. Alpha reliabilities for the non-work social support for instrumental reasons scale was .73 and .87 for the social support for emotional reasons measure. It appears that both scales across contexts have good internal reliability.

The third scale within the pilot study questionnaire derives from Spector & Jex (1998) measuring interpersonal conflict (items 1-4) and quantitative workload (items 5-9). The aim of this measure is to investigate whether the two scales again have good internal consistency when measured within a non-working life context. However, the two scales internal reliability has been examined within a workplace context producing a .74 alpha coefficient for the interpersonal conflict scale and .82 for the quantitative workload scale (Spector & Jex, 1998). The findings reveal a two-item scale for the interpersonal conflict scale (alpha .71) and a three-item scale for the quantitative workload scale (alpha .77). These scales were preferable over all other alternative item solutions for both measures. Items 3 and 4 were selected for the interpersonal conflict scale and items 7, 8 and 9 for the quantitative workload scale.

8.4 Procedure for the Psychometric Analysis of the Questionnaires

The individual description and discussion for each of the scales used within the present study shall investigate the following psychometric analysis for both the university and student/nurses sample questionnaires. Initially a definition of what the scale attempts to measure and who developed it shall be put forward followed by the measures subscales and the number of associated items reflecting each subscale. Further information regarding the instructions given to respondents on how to complete the scale and type of Likert scale implemented will be briefly discussed.

Although previous studies have established acceptable levels of internal reliability for the various scales used within the current research, further analysis shall nonetheless be performed next via the use of data sets from other previous studies and the present studies samples and pilot study. Where necessary, in order to further confirm a scale's psychometric properties, additional psychometric tests of internal consistency for each scale used within the study has to be examined and performed by other authors (Scheck, Kinicki & Davy, 1995).

Further developments of each scale over the years shall be looked at where appropriate. Changes to the final measure will also be outlined based upon the Cronbach's alpha analysis where necessary, such as item deletion/selection etc.

Additional information on coefficient alpha is worth noting before proceeding with the analysis within sections 8.5 and 8.6. Alpha coefficients greater than 0.70 are considered acceptable. However, Cortina (1993) argues that coefficient alpha should be interpreted with some caution. The author indicates that the number of items within a scale has a profound effect on alpha and therefore should be used with caution. For example, when a scale has more than 20 items it can yield an alpha of 0.70 even when correlation between the items very small. Conclusions from Cortina (1993) generally suggest that the greater the number of items within a scale the greater the possibility that alpha is meaningless based upon item correlation's (see Cortina, 1993 for a full discussion). It would seem then that the scales incorporated within the present study are relatively short and therefore less unlikely to yield meaningless alphas.

The procedure for both sections 8.5 and 8.6 follow the order of the two questionnaires sections 1, 2 and 3. For example, both examinations of measures begin with section 1 (work-related), then section 2 (non-work related) and finally section 3 (context-free and demographic information).

Since the questionnaire for both the working/non-working students and trainee nurses' samples incorporated within this study are identical, the data for both samples have been pooled together. This strengthens the psychometric analysis within the present research by increasing the overall sample size to 1235. Reliability analysis shall be performed on baseline data only from both groups of data.

Although Cronbach's alpha is a useful psychometric technique in the analysis of scales (i.e. internal reliability analysis), there are however alternative and broader analytic tools that can be used to examine a scales psychometric properties. For example, to investigate test-retest reliability analysis on data that is longitudinal, to perform confirmatory factor analysis on established measures in order to identify measurement models using structural equation modeling (SEM) techniques or by conducting multi-group analysis on studies which contain numerous groups of data. See Guppy, Edwards, Brough, Peters-Bean, Sale & Short (2004) who incorporate all these psychometric techniques on a coping scale. All these psychometric procedures could be undertaken within the present study since this research incorporates longitudinal design, SEM and uses multi-group data. However, whilst the current study has made every attempt to use reliable and valid measures, the main aims and purposes are not psychometric in nature. Thus, this research will only perform internal reliability analysis on baseline data for both samples of data.

Throughout sections 8.5 and 8.6 refer to Appendix 2.3 and 2.4 for copies of all measures used in both questionnaires for both samples of data.

8.5 University Staff Questionnaire

The following sections of this chapter provide information regards the scales used within the current sample of university staff. Scales are discussed in the order they are presented in the questionnaire.

8.5.1 Section 1: Your Working Life

This specific section relates to the measures used within the questionnaire from part a) through to part g) reflecting respondent's life at work.

8.5.1.1 Work-Related Stress

Four and five item scales were used from Spector & Jex's (1998) Interpersonal Conflict at Work Scale (ICAWS) and Quantitative Workload Inventory (QWI) respectively to measure stress at work. Both measures were merged together in one nine-item scale. The first four items represent the ICAWS and the following five items represent the QWI. Keenan & Newton (1985) suggest that interpersonal conflict within the workplace is one of the most frequent reported job stressors. Spector & Jex (1998) consider that quantitative workload reflects the amount or quantity of work in a job, as opposed to qualitative workload which measures the difficulty associated with work. Respondents were asked to indicate how often each item occurs at work for both scales. Responses were recorded on a five point Likert-type scale ranging from 1 = *Less than once per month or never*, through to 5 = *Several times per day.* High scores represent frequent conflict with others (ICAWS) and high level of workload (QWI).

The internal reliability coefficient alpha reported by Spector & Jex (1998) to average .74 across 13 studies for the ICAWS. Coefficient alpha across 15 studies for the QWI was .82 on average indicating an acceptable/good level of internal consistency for both scales. Cronbach's alpha reliability coefficients produced by the current university staff sample baseline data was .70 for the ICAWS and .91 for the QWI. Thus, studies indicate an acceptable/good level of internal consistency for both the stress at work scales.

8.5.1.2 Work-Related Control

Personal control at work was measured using Pearlin & Schooler's (1978) mastery scale shown in section c) of the questionnaire. Three-items reflect perceived psychological control. This scale represents one of the individual differences thought to mediate the stress response and was discussed within Chapter Three. Participants were requested to indicate the extent to which they agreed with each of the three items on a four point Likert type scale where 1 = *Strongly Agree*, through to 4 = *Strongly Disagree*. The third item is reverse scored. A high score on this scale represents a high degree of personal control at work.

Reliability analysis for this scale has been reported by authors in previous research. For example, Folkman et al (1986b), Thoits (1987), Franks & Faux (1990) and Huyck (1991) have reported Cronbach's alpha coefficients of .75, .80 and .74 respectively. Additional analysis performed on data sets from Brough (1998) and Harris (1998) as well as the present studies university sample showed alpha reliabilities of .71, .86 and .76 respectively, thus indicating good internal consistency for the job-related control scale used within this study.

8.5.1.3 Work Performance

Work performance was assessed using a three-item scale developed by Guppy & Marsden (1997). Items are rated on a five point Likert-type scale (1 = *Noticeably Better*, through to 5 = *Noticeably Worse*) with low scores representing improved job performance. Participants were asked to perceive their work performance over the past three months. Data from both Harris and Brough (1998) and the current study produced a Cronbach's alpha of .74 indicating good internal reliability.

8.5.1.4 Work-Related Mental Health

Warr's (1990) job competence, job aspiration and negative job carry-over scales were included as one continuous measure in part f) of the university staff questionnaire. The scales generally measure aspects of mental health within the workplace. These three measures are relevant within the multi-component aspect of well-being developed by both Cooper (1986) and Warr (1987) which was discussed at length within Chapter One. Job competence is represented by items 1-4, job aspiration is represented by items 5-8 and negative carry-over is represented by items 9 and 10. Respondents were asked to indicate how far they agreed with the items in relation to the last few weeks at work. The level of agreement is indicated on a five point Likert type scale where 1 = *Strongly Disagree* through to 5 = *Strongly Agree.* Items 2, 4, 5 and 7 are all reversed scored. High scores represent greater levels of mental health.

Originally, the three scales consisted of six items for competence, six items for aspiration and four items for negative job carry-over which produced internal reliability coefficients of .68, .62 and .78 respectively (Warr, 1990). However, within the current research, all three scales underwent extensive reliability analysis in an attempt to strengthen internal consistency and reduce the scale length. Thus, using data from Brough (1998), a four item competence scale (the same item selected within the questionnaire for this study) produced a Cronbach's alpha of .71 and for Harris (1998) .74. An alpha coefficient of .67 and .65 was exhibited for the four item aspiration scale for Brough (1998) and Harris (1998) respectively. A two item negative work carry-over measure generated a reliability alpha of .84 (Brough, 1998) and .93 (Harris, 1998). Cronbach's alpha coefficient produced by the present studies university staff data for the three scales are: competence, .69, aspiration, .47 and negative carry-over, .90.

8.5.1.5 Work-Related Affective Well-Being

Warr's (1990) scale measuring affective well-being in the workplace was also utilized within the first sample questionnaire (part g)). The two subscales incorporated within the measure reflect two of Warr's well-being axes. For example, items 1-4 measure job-related anxiety-contentment and items 5-8 measure job-related depression-enthusiasm. It should be noted that Warr's (1990) study used six items per scale. Respondents were asked to indicate to what extent over the last few weeks in their work had the items listed made them feel. The measure incorporates a six point Likert type scale where 1 = *Never* through to 6 = *All of the Time*. A high score reflects a greater level of well-being. However, responses to items 1, 2, 5 and 6 are reversed scored.

Although this measure has undergone further psychometric analysis since 1990 (Sevastos et al, 1992, Warr, 1992, Daniels et al, 1997 and Daniels, 2000), there doesn't appear to be any great improvement in the two scales. Thus, the current study uses items from Warr's (1990) original scale development where the scales produced Cronbach's alpha reliabilities of .76 (job-related anxiety-contentment) and .80 (job-related depression-enthusiasm). Further reasons for selecting items from Warr (1990) rather than later research is based upon the analysis of data from two alternative studies. For example, Brough (1998) revealed an alpha coefficient of .77 for the anxiety-contentment scale and .81 for the depression-enthusiasm scale. Harris (1998) found alpha coefficients of .84 and .80 for the two scales respectively. Both studies selected the same four item per scale solution. Reliability analysis for the current study for the same four items exhibited Cronbach" alpha coefficients of .86 for the anxiety-contentment scale and .87 for the depression-enthusiasm scale. Thus, the two four item scales appear to have good internal consistency.

8.5.2 Section 2: Your Non-Working Life

This section refers to the scales incorporated within the questionnaire from part a) through to part e) measuring participants responses to their life outside of work.

8.5.2.1 Non-Work Stress

Stress in non-working life was measured on two and three item scales measuring interpersonal conflict and quantitative workload. Both scales derive from Spector & Jex (1998) stressor at work used within the current questionnaire in part a) of your working life section and discussed within the present chapter in section 9.5.1.1. However, the two scales items have been paraphrased in order to accommodate a non-working life context. For example, the context of the behaviour that is described in the items remains the same but the context in which the behaviour occurs is altered from working life to non-working life. Also, the instructions to complete the scales refer to a respondent's non-working life. In choosing a non-working life stress scale, an effort was made to indicate items that could be answered from both domains of life (see carver et al, 1989, pp, 270-271 for a more in-depth discussion regarding incorporating the same scale across contexts).

Item 1 and 2 reflect interpersonal conflict and items 3, 4 and 5 reflect quantitative workload. Instructions asked respondents to indicate how often each item occurs outside of work. The same as the workplace stressor scales, a five point Likert type scale was used to record responses where 1 = *Less than once per month or never* through *to Several times per day* with high scores reflecting frequent conflict with others and high levels of quantitative workload in participants life outside of work. See section 1.5.4 in Chapter One for a definition and discussion of work and non-work domains of life.

Since both scales have never been incorporated into a non-working life context before in previous research, a pilot study measuring both scales was conducted to examine the scales internal reliability. Both scales produced good Cronbach's alpha reliability coefficients (see section 9.3 within the current chapter for the results of the pilot study and further discussion). Reliabilities derived from the group of university staff data within the present study produced Cronbach's alpha coefficients of .75 for the

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however utilized within a general/context-free domain. The items and scale design is exactly the same as the non-work control scale used in section 9.5.2.3, however with participants being asked to respond to the items within a context-free domain of life.

See section 9.5.1.2 for reported Cronbach's alpha reliability coefficients from previous research on this scale. However, the current control scale is to be incorporated within an everyday life context. Thus, reliability analysis on the present sample of data exhibited a good coefficient alpha of .80.

8.5.3.2 Negative Affectivity

Negative affectivity was measured on a four item scale taken from Eysenck, Eysenck & Barrett's (1985) revised short version neuroticism scale. The pervasive personality trail scale measuring negative affectivity is widely incorporated within stress and well-being studies. Respondents were asked to indicate the extent to which the four items generally applied to themselves. Participants answered upon a four item Likert type scale where 1 = *Almost Never*, through to 4 = *Almost Always.* High scores reflect high levels of negative affectivity.

Eysenck et al (1985) reported Cronbach's alpha reliability coefficients of .80 and .84 for two samples of data for the scale. More recently, Parkes (1990) reported a coefficient alpha of .86 and Moyle (1995) a coefficient of .84. Reliability analysis was nevertheless conducted using the sample of data from the current study, since this was a four item scale, and revealed a Cronbach's alpha of .80. Thus, different negative affectivity scales (i.e. the number of items within the scale), all produce good reliability coefficient alphas.

8.5.3.3 Context-Free Well-Being

Goldberg's (1972) unidimensional twelve-item General Health Questionnaire (GHQ-12) was implemented within the present research for the detection of minor mental health disorders within a non-situation specific context. This measure was incorporated within the questionnaire in an attempt to differentiate between other well-being scales also used (i.e. Warr's, 1990, work-related mental health scales, work-related affective well-being scales and the non-work mental health scales all discussed within section 10.5.1 and 10.5.2). Respondents were asked to answer the twelve questions via a consideration of their general health behaviours over the past few weeks. Participant's responses were measured on a scale by choosing one of four answer alternatives: *'Better than usual', 'Same as usual', 'Less than usual' and 'Much less than usual'.* Other alternative responses were answered with a similar, but negatively worded answer format: *'Not at all', 'No more than usual', 'Rather more than usual' and 'Much more than usual'.* The GHQ is scored via a Likert type method on a scale format of 0-3. High scores reflect greater levels of minor mental health problems.

The GHQ can be administered in several different forms depending upon item scale variations, which vary from 12 to 140. The GHQ-12 has been effectively utilized by authors over the years (Parkes, 1991, Daniels & Guppy, 1992; 1994 and Guppy & Weatherstone, 1997). Within previous research, the GHQ-12 has consistently produced good internal reliability estimates. For example, Cronbach's alpha coefficients for Brough (1994) was .90 and for Moyle (1995) .90. A reliability alpha of .93 was produced from the sample of data from the current study.

8.5.3.4 Demographic Information

This final section of the university staff sample questionnaire was administered in order to determine the characteristics of the respondents and to match-up responses for individual participants over time (see part f)). The demographic details requested were gender, data of birth, current domestic status, care of dependants, length of employment, number of hours normally worked, job title, salary and type of work pattern.

8.6 Working/Non-Working Students & Trainee Nurses Questionnaire

The following sections of this chapter provides information in relation to the scales incorporated within the current questionnaire presented to the sample of pooled work, non-working and nursing students. See Chapter Seven for an outline of the three related groups. All scales used were also incorporated within the university staff questionnaire with slight changes to some particular scales. These alterations shall be noted and discussed accordingly. Scales are discussed in the order they are presented in the questionnaire.

8.6.1 Section 1: Your University Working Life

This section relates to the scales incorporated within the questionnaire representing student's university working life.

8.6.1.1 Work-Related Mental Health

Warr's (1990) reported job competence, job aspiration and negative job carry-over scales were used within part a) of the student questionnaire measuring aspects of mental health in ones working life. Job competence is reflected in items 1-6, job aspiration is represented by items 7-12 and negative work carry-over is reflected in items 13 and 14. Participants were asked to indicate how they agreed with the items in regards to the last few weeks in their working life at university. The same Likert type scale used within the university staff sample questionnaire was incorporated (see section 8.5.1.4), however, with items 2, 4, 6, 8, 10 and 12 reverse scored.

The six item competence and aspiration scales produced reliability alpha's of .68 and .62 respectively in Warr's (1990) study. Data from Harris (1998) produced Cronbach's alpha coefficients of .77 (competence) and .65 (aspiration). A reduced two item negative work carry-over scale exhibited an alpha level of .84 (Brough, 1998) and .93 (Harris, 1998). Data from the present study of working, non-working and nursing students produced alpha coefficients of .54 (competence), .66 (aspiration) and .71 (negative work carry-over). The item lengths of the competence and aspiration scales for this questionnaire differs in length to that of the university staff questionnaire by including an extra two items per scales, the same as Warr's (1990) original measure. The rationale for this was to test both scales internal reliability.

8.6.1.2 Work-Related Affective Well-Being

Similarly, Warr's (1990) affective well-being scale measured within the workplace was also used within this questionnaire as it was for the university staff questionnaire. The two four item scales measure work-related anxiety-contentment and depression-enthusiasm. The scale items, instructions and Likert type scale design is exactly the same as the university staff questionnaire measure (see section 8.5.1.5). Development of the scale, previous research undertaken, as well as the scales psychometric history (reliability analysis) on numerous data sets is also discussed within section 8.5.1.5.

Further re-examination on Harris's (1998) data set produced a Cronbach's alpha reliability coefficient of .77 for the job-related anxiety-contentment scale and .65 for the job-related depression-enthusiasm scale. The present studies analysis of the measure for the student group of data revealed alpha coefficients of .79 and .70 for the competence and aspiration scales respectively indicating acceptable reliability for the measures.

8.6.1.3 Work-Related Stress

Stress in working life at university was measured on the four item Interpersonal Conflict at Work Scale (ICAWS) and the five item Quantitative Workload Inventory (QWI) from Spector & Jex (1998). These two scales are exactly the same as the stress scales used within the university staff questionnaire. See section 8.5.1.1 for further information and reliability estimates for both scales from the university staff data and from Spector & Jex (1998).

Further investigation of the scales internal reliability was conducted on the current data. Findings reveal a Cronbach's alpha of .73 for the ICAWS and .85 for the QWI. Results suggest both scales possess good internal reliability.

8.6.1.4 Work Performance

Guppy & Marsden's (1997) work performance measure was also utilised within this questionnaire (part e)). Respondents were asked on a three item scale to indicate their perceived work performance at university over the last few months. The scale used was the same as the one incorporated within the university staff questionnaire (see section 8.5.1.3).

Section 8.5.1.3 presents results of reliability analysis for the work performance scale. However, an improved Cronbach's alpha coefficient of .75 was produced from the questionnaire data of students.

8.6.1.5 Work-Related Control

Control within university working life was measured using Pearlin & Schooler's (1978) three item mastery scale. The same scale was used within the university staff questionnaire (see section 8.5.1.2), however students were instructed to respond to the items within a university working life context.

Previous research reporting the scales internal reliability can be seen in section 8.5.1.2. Data from the present group of students produced a Cronbach's alpha of .60.

8.6.2 Section 2: Your Social Life

The following sections relate to the scales within the questionnaire from part a) through to part e) which measures working, non-working and nursing students life outside of work.

8.6.2.1 Non-Work Mental Health

Measures from Warr (1990) were used in part a) of this section of the questionnaire to measure participant's individual feelings of mental health outside of work. The three scales used are non-job competence (items 1-6), non-job aspiration (items 7-12) and negative non-job carry-over (items 13 and 14). The same scale design as the university staff questionnaire was used (instructions to respondents and Likert scale), however, the current questionnaire incorporated 14 items as opposed to 10 with items 2, 4, 6, 8, 10 and 12 reversed scored (see section 8.5.2.3).

For a breakdown of the scales internal reliability over the years reported in previous papers, again see section 8.5.2.3. Cronbach's alpha analysis from the current studies student data was conducted on the three scales. Thus, non-job competence produced an alpha coefficient of .68, non-job aspiration .65 and negative non-job carry-over .68.

8.6.2.2 Non-Work Affective Well-Being

In order to compare levels of affective well-being in respondents across work and non-work domains, Warr's (1990) scale was used within a non-work context within the current questionnaire. Non-work anxiety-contentment is represented by items 1-4 and non-work depression-enthusiasm is reflected in items 5-8. Respondents were asked to indicate to what extent over the past few weeks in their non-working life had the items listed made them feel. The scale design, Likert type scale used, number of items, item content and reversed scored items are exactly the same as the scales used in both the university staff sample questionnaire (section 8.5.1.5) and the current student sample questionnaire (section 8.6.1.2) for life at work section.

For a detailed summary of the scales psychometric history within a work-related context, see again section 9.5.1.6. The present sample of data revealed a Cronbach's alpha of .81 for the non-work anxiety contentment scale and .71 for the non-work depression-enthusiasm scale suggesting a good level of internal consistency for the two scales.

8.6.2.3 Non-Work Stress

Stress experienced in students life outside of work (social life) was again measured using scales from Spector & Jex (1998). Thus, items 1 and 2 represent interpersonal conflict and items 3, 4 and 5 represent quantitative workload. However, the two scales have been paraphrased to suit non-working life. Exactly the same scale was used within section 8.5.2.1 (non-work stress for the university staff questionnaire) and shows how the scales have been changed to accommodate non-working life.

Section 8.5.2.1 also shows evidence from the pilot study regarding the two scales internal reliability as well as section 9.3 (pilot study). Evidence from the current sample of data representing working, non-working and nursing students produced an alpha reliability coefficient of .75 for the interpersonal conflict scale and .83 for the quantitative workload scale again suggesting a good level of internal consistency for both measures.

8.6.2.4 Non-Work Control

Pearlin & Schooler's (1978) three item mastery scale was again included within the current questionnaire to measure perceived psychological control in a non-work context. Exactly the same scale for this section was used in the university staff questionnaire (section 8.5.2.) i.e. the scales design, instructions to respondents, Likert type scale, number of items, item content and scoring are all the same.

Section 8.5.2.2 also summarises the scales psychometric properties from previous research, Brough (1998) and the current sample of university staff employees which all exhibited good alpha reliabilities. The present sample of data revealed a Cronbach's alpha coefficient of .79.

8.6.3 Section 3: General (Context-Free)

This section of the chapter concerns the measures used within the working, non-working and nursing student's questionnaire regarding responses to everyday context-free life

8.6.3.1 Negative Affectivity

Exactly the same four item negative affectivity scale measuring neuroticism in respondents used within the university staff questionnaire (see section 8.5.3.2) was also incorporated within the current student questionnaire. For example, the scale design, instructions to respondents, Likert scale, number of items, item content and scoring are all the same for both questionnaires. This revised short version of the scale is derived from Eysenck et al (1985).

An investigation of the scales internal reliability is summarises also in section 8.5.3.2 from previous research and data from the university staff questionnaire. The working, non-working and nursing student's sample of data derived from the present questionnaire revealed a good reliability alpha coefficient of .80.

8.6.3.2 Context-Free Well-Being

The General Health Questionnaire (GHQ) developed by Goldberg (1972) was incorporated within the present questionnaire to measure minor mental health problems in respondents within an everyday context-free domain of life. This scale is the same as the GHQ used within the university staff questionnaire (see section 8.5.3.3), however the present scale incorporates eight items rather than 12. For example, the scale design, instructions to respondents, item content and scoring are the same for both questionnaires.

A brief history of the GHQ's psychometric properties was also examined within section 8.5.3.3. The current data of students produced a Cronbach's alpha coefficient of .83 for the eight item GHQ measure suggesting good internal reliability.

8.6.3.3 Demographic Information

This section of the working/non-working students and trainee nurses' questionnaire measures the individual characteristics of participants, which also enables the matching-up of responses from students over time. The content of this section is somewhat similar to that of the university staff questionnaire. The demographic information requested are gender, date of birth, current domestic status, whether the respondents had care of dependents, whether the participants had a job outside of university and if so, what is the job title, the length of the current employment and whether it is part-item or full-time. Questions were also asked regarding the number of hours worked, salary and finally type of work pattern.

8.7 Summary of Chapter Eight

Chapter Eight describes the two questionnaires used within the current research. The chapter begins by discussing the design of the questionnaires and puts forward the similarities and differences between the pre-published standardised scales used. Section 8.3 explains why a pilot study was conducted and reveals the psychometric properties of the scales tested prior to administration. This is followed by a section explaining the run-down of the procedure for the psychometric analysis of the two questionnaires within the following sections 8.5 and 8.6. These two sections provide information on all the scales uses. For example, who designed the scales, what they are measuring, scale design, item content, instructions to respondents, subscales incorporate, the development of the scales over the years and an in-depth psychometric reliability analysis of all the scales from previous research, alternative data sources and data from the present research. Overall,

all scales used in both questionnaires appeared to be consistently reliable and valid. Section 8.5 and 8.6 also acknowledge the three sections within each questionnaire relating to work, non-work and context-free domains of life. Table 2.1 and 2.2 present an overview of all the scales incorporated within both the university staff questionnaire and the working/non-working students and trainee nurses questionnaire in the order they are represented in the respective questionnaires.

Table 2.1: Summary of Scales from the University Staff Questionnaire

Outcomes to be Measured	Measurement Tool
Work-Related Stress	**Interpersonal Conflict at Work Scale, ICAWS,** (Spector & Jex, 1998). A 4-item scale measuring interpersonal conflict in the workplace. **Quantitative Workload Inventory, QWI,** (Spector & Jex, 1998). A 5-item scale measuring quantity of work in a job.
Work-Related Control	**Mastery Scale** (Pearlin & Schooler, 1978). A 3-item scale measuring perceived control over the individuals working life.
Work Performance	**Work Performance**, (Guppy & Marsden, 1997). A three-item scale measuring perceived work performance
Work-Related Mental Health	**Competence/Aspiration/Negative Work Carryover** (Warr, 1990). A 10-item scale measuring concepts of work-related well-being.
Work-Related Affective Well-Being	**Affective Well-Being** (Warr, 1990). An 8-item scale measuring job-related anxiety-contentment and job-related depression-enthusiasm.
Non-Work Stress	**Interpersonal Conflict Outside of Work** (Spector & Jex, 1998). A 2-item scale measuring interpersonal conflict outside of work. **Quantitative Workload Inventory, QWI,** (Spector & Jex, 1998). A 3-item scale measuring quantity of workload outside of work.
Non-Work Control	**Mastery Scale** (Pearlin & Schooler, 1978). A 3-item scale measuring perceived control over an individuals non-working life.
Non-Work Mental Health	**Competence/Aspiration/Negative Non-Work Carryover** (Warr, 1990). A 10-item scale measuring concepts of non-work-related well-being.
Context-Free Control	**Mastery Scale** (Pearlin & Schooler, 1978). A 3-item scale measuring perceived context-free control.
Negative Affectivity	**Negative Affectivity** (Eysenck, Eysenck & Bartlett, 1985). A 4-item scale measuring neuroticism in terms of personality trait.
Context-Free Well-Being	**General Health Questionnaire** (GHQ12, Goldberg & Williams, 1988). A 12-item unidimensional scale measuring context-free well-being.

Table 2.2: Summary of Scales from the Working/Non-Working Students & Trainee Nurses Questionnaire

Outcomes to be Measured	Measurement Tool
Work-Related Mental Health	**Competence/Aspiration/Negative Work Carryover** (Warr, 1990). A 14-item scale measuring concepts of work-related well-being.
Work-Related Affective Well-Being	**Affective Well-Being** (Warr, 1990). An 8-item scale measuring job-related anxiety-contentment and job-related depression-enthusiasm.
Work-Related Stress	**Interpersonal Conflict at Work Scale, ICAWS**, (Spector & Jex, 1998). A 4-item scale measuring interpersonal conflict in the workplace. **Quantitative Workload Inventory, QWI**, (Spector & Jex, 1998). A 5-item scale measuring quantity of work in a job.
Work Performance	**Work Performance**, (Guppy & Marsden, 1997). A three-item scale measuring perceived work performance
Work-Related Control	**Mastery Scale** (Pearlin & Schooler, 1978). A 3-item scale measuring perceived control over the individuals working life.
Non-Work Mental Health	**Competence/Aspiration/Negative Non-Work Carryover** (Warr, 1990). A 14-item scale measuring concepts of non-work-related well-being.
Non-Work Affective Well-Being	**Affective Well-Being** (Warr, 1990). An 8-item scale measuring outside of work anxiety-contentment and job-related depression-enthusiasm.
Non-Work Stress	**Interpersonal Conflict Outside of Work** (Spector & Jex, 1998). A 2-item scale measuring interpersonal conflict outside of work. **Quantitative Workload Inventory, QWI**, (Spector & Jex, 1998). A 3-item scale measuring quantity of workload outside of work.
Non-Work Control	**Mastery Scale** (Pearlin & Schooler, 1978). A 3-item scale measuring perceived control over an individuals non-working life.
Negative Affectivity	**Negative Affectivity** (Eysenck, Eysenck & Bartlett, 1985). A 4-item scale measuring neuroticism in terms of personality trait.
Context-Free Well-Being	**General Health Questionnaire** (GHQ12, Goldberg & Williams, 1988). An 8-item unidimensional scale measuring context-free well-being.

CHAPTER NINE: PROCEDURE

9.1 Overview of Chapter Nine

Chapter Ten provides a run-down of the procedure undertaken within the current study to administer questionnaires to three groups of participants at a university in England (staff employees, working/non-working students and trainee nurses). All three sections provide information regards issues of confidentiality, ethical approval, how participants were appointed, how permission was obtained, the different distribution techniques undertaken to administer the questionnaires, how the questionnaires were returned by respondents and the procedure for the follow-up distribution.

9.2 University Staff

The self-completion questionnaire outlined within section 8.5 was distributed to staff employees across campuses at a university in South East England in April (2001) during semester two of academic year 2000-2001. The questionnaire required approximately 10-15 minutes to complete. A covering letter accompanied the questionnaire (see Appendix 2.1) which indicates the purpose of the study and that the study is confidential and voluntary. Request for consent was also acknowledged. The covering letters were discussed at length in section 8.2 (Questionnaire Design).

However, initially participants were identified as well as obtaining ethical approval. Permission was obtained to conduct the survey on the sample of participants from the director of communication at the institute concerned. Application for ethical approval was processed by the appropriate ethics committee and was approved.

A number of different complementary distribution techniques were used to administer the questionnaire. One approach was via hard copies through the internal mail system at the university. The other two alternative techniques used were electronic i.e. via attached e-mail and through the university staff intranet service. E-mails with an attached questionnaire were sent to employees with accompanying text. The text was the same as the covering letter content accompanying hard copies of the questionnaire, however with additional information instructing participants to print-off the questionnaire a complete. Similarly, a request on the university intranet homepage was conducted with instructions to participants to download the questionnaire and complete. See Appendix 2.6 for a copy of the texts. It should be noted that exactly the same questionnaire was distributed, regardless of the particular distribution technique imposed. All respondents who completed the questionnaire, whether it is via hard copy (internal mail), e-mail attachment or the intranet, returned it through the internal mail system at the university.

The second sampling procedure occurred approximately two months after the first in June (2001). Examples of previous studies incorporating a two-month longitudinal time lag in organizational health research is Wanous (1974) and Theorell, Leymann, Jodko, Kanorski & Norbeck (1994). The third and final sampling procedure was approximately four months after the second in October (2001), academic year 2001-2002. An example of other studies using a four month time lag in organizational research is from Miles (1975). Covering letters accompanying the distribution of the questionnaire at both the second and third time phases are also in Appendix 2.1. Text for the intranet messages at both time points are in Appendix 2.6. Questionnaire responses across time phases for the same members of staff were matched-up via date of birth.

9.3 Working/Non-Working Students & Trainee Nurses

The working, non-working students questionnaire discussed within section 8.6 was administered to students across campuses at the same university as the staff employees sample from November 2001 during semester one academic year 2001-2002 through to the start of semester two in February 2002. Similarly, as with the university staff questionnaire, a covering letter accompanied the student questionnaire (see Appendix 2.2).

Before questionnaires were distributed, ethical approval was attained via the university ethics committee. Again, similarly to the university staff procedure, a number of distribution techniques were used to administer the questionnaire. One technique was to attend lectures across different campuses, explain the purpose of the research to participants, distribute hard copies of the questionnaire and have respondent's hand return the completed questionnaire. Lecturers who were module leaders were contacted initially to request permission to attend lectures. Mainly first year core modules on programmes of study that had high student intakes were approached in order to distribute as many questionnaires as possible.

As with the university staff distribution approach, the other two techniques were electronic. For example, global internal e-mails via the university network system were distributed to participants. The text was again similar to that contained in the covering letters accompanying the hard copies distributed at lectures. However, instructions asked the respondents to reply to the e-mail if they agreed to participate in the study indicating how they preferred the questionnaire to be delivered. For example, via internal post, through the university post system, external mail via royal mail or as an attachment for the participants to print out and complete. All questionnaires posted accompanied a self-addressed envelope. Also, a request on the university student intranet homepage was conducted with instructions for students to either download or print-out the questionnaire and complete as well as alternative methods. See Appendix 2.7 for a copy of the text on the intranet. The same questionnaire was distributed regardless of the distribution approach used. All questionnaires were returned via postal internal or external mail for the e-mail and intranet distribution techniques.

The second follow-up questionnaire was distributed approximately three months after the baseline sampling procedure from February 2002 through to May 2002 during semester two. Examples of other studies that incorporate a three month lag in longitudinal organizational behaviour research are Greene (1979), Ivancevich (1979), Fisher (1985), Lang & Markowitz (1986) and Digman & West (1988). Questionnaires accompanied a covering letter at the second time phase also (see Appendix 2.2). Matching-up of responses from participants was undertaken via student numbers and date of birth.

9.4 Trainee Nurses

The nursing questionnaire (see section 8.6 and Appendix 2.4) was administered across university campuses and university hospital campuses during February 2002 (semester two of academic year 2001-2002). Trainee nurses studying academic modules whilst on placement, were registered at the same university as the university staff employees and the working/non-working students samples. The exact same covering letter accompanied the questionnaire as for the working/non-working student's questionnaire (see Appendix 2.2).

Permission to conduct the research was firstly obtained. A report was drafted initially and sent to the nursing programme module leaders outlining the aims and purpose of the study. This was followed by the university nursing department ethics board committee approving the research to go ahead. As for both the university staff employees and the working/non-working students, the current questionnaire was distributed in a number of ways. The same distribution techniques that were incorporated for the working/non-working students were also used for the current questionnaire. For example, administering hard copies at lectures and university hospitals, sending global e-mails and a request on the university student intranet homepage. See the previous section 9.3 for further detail on how the questionnaires were returned etc which is the same as for the current trainee nurses' questionnaire.

The second and final sampling procedure occurred again approximately three months after the first sampling procedure in May 2002 (semester two, academic year 2001-2002).

See section 9.3 for references of other studies over the years that have been performed within the field of longitudinal organizational health research, which have incorporated a three month time lag. Responses were matched-up over the two time phases via student number and date of birth.

9.5 Summary of Chapter Nine

Chapter Nine describes the methodological procedure undertaken in administering three sets of questionnaires to three groups of participants from the same university. Firstly, the procedure conducted in distributing the university staff questionnaire was put forward, followed by the working and non-working students questionnaire and finally the trainee nurses questionnaire. The procedure undertaken was similar for all three questionnaires. For example, all procedures established confidentiality, anonymity and requested consent from respondents. All three groups of participants obtained ethical approval before commencing with the research, different distribution techniques were imposed to distribute the questionnaires. Since the design of the current research is longitudinal, all questionnaires distributed to the three groups of respondents were followed-up with additional questionnaires.

CHAPTER TEN: ANALYTIC PROCEDURE

The following chapter shall briefly outline the statistical procedure undertaken within the Results section for both Chapters Eleven and Twelve.

Within the first chapter, descriptive statistics will be examined for all three groups of data (university staff, working and non-working students and trainee nurses) and across two time phases. Initially, demographic information shall be investigated (see parts f) and d) in SECTION 3 of both the university staff and working/non-working students & trainee nurses questionnaires in Appendix 2.3 and 2.4 respectively. This shall be followed by scale descriptive results for both questionnaires of all measures used within the current analysis. Comparisons of results between the three samples of data will also be investigated.

Chapter Twelve provides the inferential statistics for the present research (structural equation modeling). The series of three hypothesis put forward in the current study (Chapter Five, section 5.7) shall dictate the procedure of Chapter Twelve. For example, H1 (section 12.2), H2 (section 12.3) and H3 (section 12.4) shall be addressed respectively.

Each hypothesis examined will contain the same analytic techniques and statistical procedure where possible and appropriate in order to give an orderly format and flow to the results. For example, the first part of the analysis shall present the hypothesised theoretical structural equation model to be investigated to act as a baseline-working model. This will be followed by a sequence of confirmatory factor analysis for all the scales used within each particular hypothesis, which examines the chi-square statistic and a number of fit indices. Any necessary modifications to the measurement model will be employed accordingly. Next, hypothesised longitudinal structural path models will be analysed. Model modifications shall be incorporated where appropriate in an attempt to gain the best fitting model. Both the confirmatory factor analysis and structural path model analysis shall use pooled data from both the working/non-working students and trainee nurses samples of data. Once the best fitting model has been estimated, a multi-group analysis of factorial invariance shall be calculated where appropriate using the working/non-working students and trainee nurses pooled data and the university staff sample in order to strengthen findings and relevant models. An evaluation of the structural equation analysis outlined above will then be discussed. A similar analytic procedure as mentioned above shall be undertaken for each of the three hypotheses and summarised at the end of the chapter.

Throughout the results section a more thorough and in-depth examination of the analysis performed will be discussed and made clearer.

SECTION C: RESULTS

SECTION A consists of two chapters that present the results within the current research of both the descriptive statistics and the inferential structural equation modeling (SEM) analysis respectively. Chapter Eleven firstly reports the demographic results for all three samples of data used within the present study (university staff, working and non-working students and trainee nurses). This is followed by a rundown of the scores of all the scales incorporated within the research for all groups of data and a brief sequence of t-test analysis to examine responses and non-responses from participants. Chapter Twelve then conducts an extensive analysis of all data in an attempt to answer issues and address hypothesis raised within the current research and consists of three main sections (13.2, 13.3 and 13.4). All three sections address hypothesis one through to three respectively. Within each section the following sequence of SEM analysis is performed: an outline of the hypothesised theoretical SEM, confirmatory factor analysis (CFA) of each measurement model, longitudinal cross-lagged SEM path model analysis including model comparisons, multi-group invariance analysis and finally a summary of all analysis conducted within each individual section.

CHAPTER ELEVEN: DESCRIPTIVE STATISTICS

11.1 Overview of Chapter Eleven

Within Chapter Eleven, an overview of the demographic and scale descriptive statistics for the university staff, working/non-working students and trainee nurses groups of data incorporated within the current study are presented. Firstly, the demographic results are presented, followed by the descriptive scale findings from the measured used within the questionnaires. Both sections 11.2 and 11.3 incorporate a sub-section that compares the results from each group. This chapter then finishes with a summary.

11.2 Demographic Results

The following three sections shall illustrate the demographic results for all three samples of data within the present study at all phases of data collection. Figures represent valid percent for participant responses so therefore do not account for missing data. All Tables reflect information in the order it is presented within all three questionnaires.

11.2.1 University Staff

Table 3.1 below shows the demographic findings of the university staff sample of data within the present study across three time points.

It can be seen that the majority of respondents at time one were female (180; 68%), age ranging between 20 and 68 years (mean age 43) and were mainly married or co-habiting (172; 64%). In terms of dependents, the majority of respondents did not have care of children (174; 65%) or any other dependents (220; 88%).

In regards to information relating to work, the mean length of employment at the university was 7.3 years where most respondents worked on average a 38-hour week. The majority of jobs were administrative/clerical followed by academic and managerial positions (116; 43%, 91; 34%, 37; 14% respectively). Salaries ranged from below £10,00 to in excess of £40,000 with the majority of participants receiving salaries in the range of £20-25,000 (57; 22%). Most university staff had flexible work patterns (129; 50%) or worked within office hours (107; 42%).

Table 3.1 also illustrates the demographic findings at time point two and three. It can be seen that although there are slight changes in results across time phases one, two and three, there are nevertheless no obvious differences indicating stability of responses over time. Therefore it was considered not necessary or relevant to the current study to further examine data within Table 3.1.

Table 3.1: Demographic Results from the University Staff Sample across Three Time Points

Demographic Information/ Time Phases	**Categories/N/(%)**						
Gender	Male	Female					
TI	86 (32%)	180 (68%)					
T2	36 (30%)	83 (70%)					
T3	21 (29%)	51 (71%)					
Age	Min	Max	Mean				
T1	20	68	43				
T2	20	68	43				
T3	20	68	43				
Domestic Status	Married/ Co-habiting	Widowed	Divorced/ Separated	Single			
T1	172 (64%)	1 (.4%)	22 (8%)	72 (27%)			
T2	78 (63%)	1 (.4%)	11 (9%)	33 (27%)			
T3	40 (55%)	0 (0%)	8 (11%)	25 (34%)			
Care of Dependent Children	Yes	No					
T1	94 (35%)	174 (65%)					
T2	40 (33%)	82 (67%)					
T3	19 (27%)	52 (73%)					
Care of Other Dependents	Yes	No					
T1	31 (12%)	220 (88%)					
T2	13 (11%)	104 (89%)					
T3	7 (10%)	64 (90%)					
Length of Current Employment (years)	Min	Max	Mean				
T1	.1	37	7.3				
T2	.2	30	6.4				
T3	.5	35	7.4				
Hours Worked Per Week	Min	Max	Mean				
T1	6	80	38				
T2	6	70	37				
T3	16	70	38				
Job Title	Academic	Admin/ Clerical	Manage Ment	Manual	Technical	Other	
T1	91 (34%)	116 (43%)	37 (14%)	2 (1%)	9 (3%)	12 (4%)	
T2	41 (33%)	54 (44%)	16 (13%)	0 (0%)	5 (4%)	7 (6%)	
T3	22 (30%)	34 (47%)	10 (14%)	0 (0%)	4 (5%)	3 (4%)	
Salary	<£10,000	£10-15,000	£15-20,000	£20-25,000	£25-30,000	£30-40,000	£40,000+
T1	23(9%)	42(16%)	51(19%)	57(22%)	45(17%)	35(13%)	12(4%)
T2	15(12%)	21(17%)	17(14%)	30(25%)	22(18%)	12(10%)	5(4%)
T3	5(7%)	13(18%)	15(20%)	15(21%)	9(12%)	12(16%)	4(6%)
Work Pattern	Office Hours	Flexible Hours	Rotating Shifts	Set Shifts			
T1	107 (42%)	129 (50%)	7 (3%)	13 (5%)			
T2	42 (37%)	65 (57%)	1(1%)	6 (5%)			
T3	32 (44%)	32 (45%)	3 (4%)	5 (7%)			

11.2.2 Working & Non-Working Students

Table 3.2 illustrates the demographic results of the working and non-working students' sample within the current study across two time phases.

The majority of students at time point one were female (453; 69%). Age ranged between 17 and 54 years with an average mean age of 25. Participants were mainly single (531; 79%), had no care of dependent children (612; 88%) or any other dependents (647; 93%).

Demographic results show that over more than half the students were working (395; 58%). The average length of current employment outside the university was 2.3 years. However, the majority of these jobs were part-time (351; 89%). Respondents worked on average 18 hours per week. Salaries ranged from less than £5,000 up to £30-40,000. The majority of the working students received salaries less than £5,000 (211; 57%). Most of the working students had flexible work patterns (165; 45%) or set shifts (127; 34%).

Within the working and non-working students questionnaire there was an additional demographic employment related question asked which is not reported within Table 3.2. The question asked students who had a job outside university what their job title is. Since the responses from this particular question were so varied, it was felt that it would be impossible to interpret the results coherently within Table 3.2. Therefore, the results from this data shall now be interpreted briefly. Thus, by far the majority of working students had sales related jobs (96). Other jobs included cashiers (14) and shop assistants (12).

Similarly to section 11.2.1, demographic results at time point two were more or less consistent with findings at time point one.

Table 3.2: Demographic Results from the Working & Non-Working Students Sample across Two Time Points

Demographic Information/ Time Phases	**Categories/N/(%)**				
Gender	Male	Female			
T1	207 (31%)	453 (69%)			
T2	40 (25%)	122 (75%)			
Age	Min	Max	Mean		
T1	17	54	25		
T2	19	49	25		
Domestic Status	Married/ Co-habiting	Widowed	Divorced/ Separated	Single	
T1	107 (16%)	14 (2%)	19 (3%)	531 (79%)	
T2	23 (14%)	0 (0%)	6 (4%)	132 (82%)	
Care of Dependent Children	Yes	No			
T1	81 (12%)	612 (88%)			
T2	20 (12%)	166 (88%)			
Care of Other Dependents	Yes	No			
T1	46 (7%)	647 (93%)			
T2	9 (5%)	159 (95%)			
Job Outside of University	Yes	No			
T1	395 (58%)	288 (42%)			
T2	95 (56%)	74 (44%)			
Length of Current Employment (years)	Min	Max	Mean		
T1	.1	21	2.3		
T2	.1	21	2.5		
Part -Time/ Full -Time	Part -Time	Full -Time			
T1	351 (89%)	42 (11%)			
T2	85 (88%)	12 (12%)			
Hours Worked Per Week	Min	Max	Mean		
T1	5	61	18		
T2	5	41	18		
Salary	<£5,000	£5-10,000	£10-15,000	£15-20,000	
T1	211 (57%)	98 (27%)	30 (8%)	20 (5%)	
T2	48 (53%)	24 (26%)	6 (7%)	6 (7%)	
Salary Continued	£20-25,000	£25-30,000	£30-40,000	40,000+	
T1	4 (1%)	5 (1%)	1 (3%)	0 (0%)	
T2	3 (3%)	2 (2%)	0 (0%)	2 (2%)	
Work Pattern	Office Hours	Flexible Hours	Rotating Shifts	Set Shifts	
T1	33 (9%)	165 (45%)	44 (12%)	127 (34%)	
T2	12 (13%)	36 (40%)	6 (7%)	35 (40%)	

11.2.3 Trainee Nurses

Table 3.3 shows the demographic results of the trainee nurses sample incorporated within the present research across two time points.

Again, similarly to the university staff and students samples, most of the respondents at time point one were female (288; 78%). Age ranged between 19 and 70 years with a mean age of 28. Trainee nurses were mostly single (221; 59%), had no care of dependent children (246; 61%) and no care of any other dependents (298; 76%).

Findings also reveal that more than half the nurses were not doing any additional working (210; 53%). The mean length of their present employment was 2.2 years. The majority of jobs were part-time (174; 94%). Nurses worked on average 18 hours per week. Salaries ranged from less than £5,000 up to £15-20,000. The majority of the working students received salaries less than £5,000 (85; 55%). Mainly the participants had flexible work patterns (110; 65%).

As with the working and non-working students' questionnaire, the additional demographic question not shown in Table 3.3 asking what alternative job title is was also put forward in the trainee nurses questionnaire. The majority of the trainee nurses performed various types of care work jobs. For example, care assistant (45), health care assistant (25) and nursing (16).

Table 3.3 also shows the demographic findings at time point two. It can be observed that there are only small changes in the findings across time phases.

Table 3.3: Demographic Results from the Trainee Nurses Sample across Two Time Points

Demographic Information/ Time Phases	**Categories/N/(%)**			
Gender	Male	Female		
TI	80 (22%)	288 (78%)		
T2	12 (18%)	54 (82%)		
Age	Min	Max	Mean	
T1	19	70	28	
T2	19	70	29	
Domestic Status	Married/ Co-habiting	Widowed	Divorced/ Separated	Single
T1	125 (34%)	8 (2%)	19 (5%)	221 (59%)
T2	23 (34%)	4 (6%)	3 (5%)	37 (55%)
Care of Dependent Children	Yes	No		
T1	154 (39%)	246 (61%)		
T2	25 (36%)	45 (64%)		
Care of Other Dependents	Yes	No		
T1	96 (24%)	298 (76%)		
T2	9 (5%)	159 (95%)		
Job Outside of University	Yes	No		
T1	187 (47%)	210 (53%)		
T2	36 (53%)	32 (47%)		
Length of Current Employment (years)	Min	Max	Mean	
T1	.1	14	2.2	
T2	.1	10	1.6	
Part -Time/ Full -Time	Part -Time	Full -Time		
T1	174 (94%)	12 (6%)		
T2	36 (100%)	0 (0%)		
Hours Worked Per Week	Min	Max	Mean	
T1	1	50	18	
T2	5	32	20	
Salary	<£5,000	£5-10,000	£10-15,000	£15-20,000
T1	85 (55%)	46 (30%)	20 (13%)	4 (2%)
T2	13 (46%)	8 (29%)	5 (18%)	2 (7%)
Work Pattern	Office Hours	Flexible Hours	Rotating Shifts	Set Shifts
T1	0 (0%)	110 (65%)	32 (20%)	26 (15%)
T2	0 (0%)	17 (57%)	6 (20%)	7 (23%)

11.2.4 Comparison of Demographic Results Amongst all Three Samples

It can be observed from Tables 3.1, 3.2 and 3.3 that the three samples consisting of university staff, working and non-working students and trainee nurses are predominantly female. All groups were also consistent in that the majority of respondents did not have care of children (although the student sample was considerably higher) or other dependents. However, average age and domestic status amongst groups varied. For example, the university staff group were considerably older than that of the student and nursing groups and were mainly married or co-habiting where the student and nursing samples were mostly single.

In relation to the comparison of demographic results relating to employment for all the three groups, it can be seen that the information requested on the university staff questionnaire is different to that of the working and non-working students and trainee nurses groups so therefore comparison is difficult (see Appendix 2.3 and 2.4 to observe differences). However, it can be seen that the average length of present employment was substantially longer for the university staff sample than for the student and nursing samples. Also, salaries for the university staff sample were considerably higher than the other two groups. However, all three groups reported having flexible work patterns. On the whole, the nursing group did less outside work than the student group. Nonetheless, these jobs were mainly part-time where both groups worked on average 18 hours per week. The type of jobs performed by the student and nursing samples were different in that the majority jobs undertaken by the working student group was sales related work whereas for the nurses it was more care related work.

Overall it can be seen that the most similar comparison is between the working and non-working student sample and the group of trainee nurses.

11.3 Scale Descriptive Results

This section shall present the descriptive statistics results produced by the measures utilised within the current study for both the university staff group and the pooled working and non-working students and trainee nurses group. The reason the student and nursing samples of data are pooled together for analysis within this section is due the fact that the scales within both questionnaires are identical and shall be used together within Chapter Twelve for analysis. Also, this procedure was undertaken within Chapter Eight whilst examining questionnaire measures for both groups so is therefore consistent throughout the thesis. However, it should be noted for both groups of data that only the scales of interest that are incorporated within the structural equation modeling analysis within Chapter Twelve will be assessed in order to analyse the causal patterns between particular variables. This is also intended to reduce the clutter that would be experienced if all scales were to be reported. The means and standard deviations at time point one and two shall be shown and presented in the Tables the order they appear within the questionnaires.

11.3.1 University Staff

Refer to the university staff questionnaire (see Appendix 2.3) and further detailed information regarding each particular measure's associated sub-scales (Chapter Eight, section 8.5).

The means and standard deviations for the scales used within the current study for the university staff sample are presented over two time phases and across life domain below in Table 3.4. Brackets associated with particular scales reflect what each scale broadly represents.

Firstly, the mean scores produced by the current research for the two stress scales were found to be very low for the interpersonal conflict scale (5.37) and reasonably high for the workload scale (17.35). This was more or less relatively consistent over time phases and work and non-work domains (it should be noted that the number of items within the two stress scales across domains differ, therefore affecting scores). The level of personal control for the university staff group at work was average (7.92). This was stable over time. However, it appears that non-work control is somewhat higher than within the workplace which is also stable over time (9.02). Staff consider their work performance to be generally consistent over the last few months or somewhat better when responded with a mean of 8.24, a score which is constant at time phase two (note that the work performance measure is reversed scored, with a smaller mean suggesting greater work performance). University staff responses to neuroticism represented by the negative affectivity measure was relatively low across time (mean: 8.77 and 8.61 respectively)

In relation to the well-being scale scores, it can be seen that job aspiration was consistently slightly greater than that of the accompanying job competence sub-scale with a mean of 15.48 which is reasonably high. High scores represent positive well-being. This comparison is stable across work and non-work contexts and over time. Similarly, the affective well-being within the workplace score of depression-enthusiasm was reliably greater than that of anxiety-contentment over time with a mean score of 15.40 which reflects an average state of well-being. The mean score for the GHQ was 25.57 which is relatively low indicating low minor levels of mental health problems which was reliable across time one and two.

Table 3.4: Scale Descriptive Results from the University Staff Sample across Two Time Points

Scale	Mean T1	S.D. T1	Mean T2	S.D. T2
Section 1: Your Working Life				
Interpersonal Conflict (Stress)	5.37	1.90	5.25	1.72
Quantitative Workload (Stress)	17.35	5.28	16.65	5.59
Personal Control	7.92	2.14	7.85	1.92
Work Performance	8.24	2.04	8.45	1.83
Job Competence (Mental Health)	14.24	2.90	14.10	2.86
Job Aspiration (Mental Health)	15.48	2.33	15.30	2.28
Anxiety-Contentment (Well-Being)	13.52	3.98	13.47	3.95
Depression-Enthusiasm (Well-Being)	15.40	4.31	15.97	4.28
Section 2: Your Non-Working Life				
Interpersonal Conflict (Stress)	2.94	1.29	2.87	1.26
Quantitative Workload (Stress)	8.85	3.06	8.89	3.24
Personal Control	9.02	2.06	9.06	1.90
Non-Job Competence (Mental Health)	14.96	3.05	14.88	2.90
Non-Job Aspiration (Mental Health)	15.06	2.60	14.89	2.39
Section 3: General (Context-Free)				
Negative Affectivity	8.77	2.72	8.61	2.56
General Health Questionnaire (Well-Being)	25.57	6.91	24.55	6.19

11.3.2 Working/Non-Working Students & Trainee Nurses

See the working and non-working students and trainee nurses questionnaire for reference (see Appendix 2.4) as well as an in-depth discussion concerning each particular measures related sub-scales (Chapter Eight, section 8.6).

The sub-scale descriptive statistics (means and standard deviations) relating to the student sample are presented across two time points and across life domain in Table 3.5.

The mental health well-being scales of job competence and job aspiration shown in the top rows of Table 3.5 indicate again that the latter scale produces somewhat better mean scores (15.17) with this association being stable over time points one and two. The aspiration score shows that again relatively higher levels of well-being this time amongst the working/non-working and trainee nurses pooled group. However, outside of work the comparison between the two scales is the same, with scores being reasonably high as well as being reliable across time phases with job aspiration producing a mean of as high as 14.71. It should be noted that the scoring for competence and aspiration in both work and non-work contexts and over two time phases is scored with the same 4-item structure to that of the university staff sample of data (i.e. not the 6-items shown in the questionnaire). This was conducted to examine direct comparisons between group scores and also because this same scoring for both groups was calculated in order to perform the analysis within the following Chapter Twelve. The affective well-being measures of anxiety-contentment and depression-enthusiasm at both work and non-work and over time produced average levels of well-being of approximately 16.50 except job-related anxiety-contentment which revealed a somewhat lower mean of 15.17 (this score was also consistent over time).

The mean scores for the stress measures were found to be very low for the workplace interpersonal conflict scale (5.72) and average for the workload scale (14.38). This was more or less relatively consistent over time phases. These results are also reliable within the non-work domain considering the reduced number of items for these measures.

According to the mean score for the work performance scale, it appears that working students and trainee nurses found their performance at work generally somewhat better with a value of 6.73 at time point one (mean score at time phase two was more or less consistent). Control measures within the questionnaire produced overall average mean scores over time and domain.

In relation to the context-free domain measures (Section: 3 in Table 3.5), negative affectivity produced a reasonably low mean of 8.39 and 8.58 (time phase one and two respectively) indicating generally low levels of trait anxiety. Finally, context-free well-being represented by the GHQ (Goldberg, 1972) showed a baseline mean of 16.13 and 16.77 over time. This score reflects reasonably low levels of minor mental illness. It should be noted that this scale within the pooled working/non-working students and trainee nurses sample of data used an 8-item measure as opposed to a 12-item measure incorporated within the university staff questionnaire (thus, mean scores for each scale represent the measures item content).

Table 3.5: Scale Descriptive Results from the Working/Non-Working Students & Trainee Nurses Sample across Two Time Points

Scale	Mean T1	S.D. T1	Mean T2	S.D. T2
Section 1: Your Working Life				
Job Competence (Mental Health)	12.87	2.32	12.59	2.41
Job Aspiration (Mental Health)	15.17	2.50	15.32	2.26
Anxiety-Contentment (Well-Being)	13.74	3.81	13.04	4.00
Depression-Enthusiasm (Well-Being)	16.65	3.56	16.01	3.73
Interpersonal Conflict (Stress)	5.72	2.26	5.45	2.13
Quantitative Workload (Stress)	14.38	4.36	14.73	4.23
Work Performance	6.73	2.16	7.16	2.10
Personal Control	8.31	1.78	8.40	1.71
Section 2: Your Non-Working Life				
Non-Job Competence (Mental Health)	14.62	2.65	14.37	2.82
Non-Job Aspiration (Mental Health)	14.59	2.57	14.71	2.52
Anxiety-Contentment (Well-Being)	16.20	3.75	16.41	3.29
Depression-Enthusiasm (Well-Being)	16.90	3.49	17.30	3.27
Interpersonal Conflict (Stress)	3.22	1.59	3.25	1.56
Quantitative Workload (Stress)	7.54	3.02	7.56	3.14
Personal Control	8.79	2.06	8.71	2.15
Section 3: General (Context-Free)				
Negative Affectivity	8.39	2.53	8.58	2.75
General Health Questionnaire (Well-Being)	16.13	4.32	16.77	4.29

11.3.3: Comparison of the Scales Descriptive Results Between the Two Samples

It can be seen from both Tables 3.4 and 4.5 that stress amongst the university staff sample for interpersonal conflict is relatively consistent with the working/non-working student and trainee nurses pooled sample at both time points and within work and non-work contexts. However, the quantitative workload stressor scale for university staff is greater than for the student's sample again across time points and domains. The level of personal control experienced at work and non-work for both groups was similar. However, the mean score for work performance was higher for the staff group than for the student group indicating that that students perceive their overall work performance better than university staff. The negative affectivity mean values for both groups were more or less consistent, again over both time points.

In regards to the well-being scale comparisons between the two groups, all scales for job competence and job aspiration (across both time phases and life domain), anxiety-contentment and depression-enthusiasm (across both time phases) and context-free well-being (across both time phases) were on the whole similar apart from job competence. The mean value for this scale was greater for the university staff sample than for the student sample indicating higher levels of mental health (across both time phases).

11.4 Attrition Analysis: t-tests Between Respondents & Non-Respondents

The following analysis shall present the results of the independent samples t-tests analysis performed to determine whether there is a significant difference between responses and non-responses across time phases one and two. For example, time point one responses (excluding participants who responded at both time points one and two) shall be tested between time point two responses. Analysis will be conducted for both the university staff and the pooled working/non-working students and trainee nurses samples. Since the stress and well-being variables within the present study are of primary importance, these scales shall be examined.

11.4.1 University Staff

Table 3.6a shows the findings of the analysis. The two work-related stress measures (interpersonal conflict and quantitative workload) both produced non-significant (two-tailed) t-test values ($t = 1.21$, $p= 0.23$ and $t = 1.29$, $p= 0.20$ respectively). These findings imply that there is not a significant difference between the interpersonal conflict and quantitative workload stress scores between respondents and non-respondents.

Similarly, both the workplace mental health scales (job competence and job aspiration) also produced non-significant (two-tailed) t-test values ($t = 0.05$, $p= 0.96$ and $t = 0.74$, $p< 0.46$ respectively). These results suggest that there is not a significant difference between the competence and aspiration scores between respondents and non-respondents.

These non-significant results for the two stress and two well-being scales indicate that respondents and non-respondents from the university staff group were not distinct in their responses.

Table 3.6a: t-test Analysis Between Respondents & Non-Respondents from the University Staff Sample across Two Time Points

Scale: Working Life	N T1	Mean T1	S.D. T1	N T2	Mean T2	S.D. T2	t Value	P
Interpersonal Conflict	145	5.50	1.97	122	5.20	1.81	1.21	0.23
Quantitative Workload	145	17.70	5.18	122	16.90	5.37	1.29	0.20
Job Competence	145	14.26	3.15	122	14.24	2.57	0.05	0.96
Job Aspiration	145	15.57	2.27	122	15.36	2.41	0.74	0.46

11.4.2 Working/Non-Working Students & Trainee Nurses

Table 3.7a presents the results of the t-test analysis for the pooled student and nurses sample. The two work-related stress scales (interpersonal conflict and quantitative workload) exhibited non-significant (two-tailed) t-test values ($t = 1.56$, $p= 0.12$ and $t = 1.96$, $p= 0.05$ respectively). These findings indicate that there is not a significant difference between the two subscale stress scores between respondents and non-respondents for the students group of data.

Again, both the work mental health measures (job competence and job aspiration) produced non-significant (two-tailed) t-test values ($t = 1.54$, $p= 0.12$ and $t = 1.43$, $p< 0.15$ respectively). These findings suggest that there is not a significant difference between the two well-being scores between respondents and non-respondents.

These non-significant results for the two stress and two well-being scales reveal that respondents and non-respondents from the working/non-working students and trainee nurses sample produce stable responses.

Table 3.7a: t-test Analysis Between Respondents & Non-Respondents from the Working/Non-Working Students & Trainee Nurses Sample across Two Time Points

Scale: Working Life	N T1	Mean T1	S.D. T1	N T2	Mean T2	S.D. T2	t Value	P
Interpersonal Conflict	945	5.77	2.31	241	5.51	2.05	1.56	0.12
Quantitative Workload	926	14.5	4.33	238	13.88	4.47	1.96	0.05
Job Competence	951	12.92	2.29	238	12.66	2.41	1.54	0.12
Job Aspiration	941	15.11	2.48	240	15.37	2.54	1.43	0.15

11.5 Summary of Chapter Eleven

Chapter Eleven provides the demographic and descriptive results for the university staff group, the working/non-working students group and the trainee nurses group used within the current research. Comparisons between groups were also assessed. In regards to the demographic findings, there was an obvious difference between the university sample and both the student and nurses sample. Scale means were also mainly consistent between the university staff sample and the pooled sample of students and nurses. Differences were apparent however in that stress levels (quantitative workload) for the university group was greater although job competence was also greater for this group. Nonetheless, students considered they experienced higher levels work performance than the staff sample. Chapter Eleven then provides a sequence of t-test analysis in order to determine whether there is a significant difference between respondents and non-respondents.

CHAPTER TWELVE: STRUCTURAL EQUATION MODELING ANALYSIS

12.1 Overview of Chapter Twelve

Chapter Twelve reports the results of a series of structural equation modeling (SEM) examinations in order to address issues concerned with the three hypothesis relevant to the current research. Thus, Chapter Twelve is divided into three sections, each of which investigates hypothesis one to three (H1-H3: 13.2, 13.3 and 13.4 respectively). Since the following analysis is extensive, each of the three individual sections conducts the same sequence of analysis in order to establish a flow and format to the proceedings. Firstly, the sections will outline an overview of the forthcoming analysis followed by a hypothesised theoretical SEM upon which to examine concepts. Confirmatory factor analysis (CFA) of each measurement model used in relation to each specific hypothesis shall then be examined. Longitudinal cross-lagged SEM path model analysis will be performed in order to establish each of the models goodness-of-fit. Model comparisons go on to distinguish which of the nested models associated with each specific hypothesis produces best fit. In an attempt to further conduct an in-depth and rigorous statistical analysis using SEM, the best fitting model within each section reflecting each of the three hypothesis will undergo multi-group invariance analysis on data sets from the current research in order to determine whether the best fitting models encompass cross-validity. Finally, all the analytic findings from the three individual sections are summarised within section 13.5.

12.2 Structural Equation Modeling Analysis: Research Hypothesis One - Stress & Well-Being

All the structural equation modeling (SEM) analysis shall now be conducted as outlined within Chapter Ten (Analytic Procedure). This section which addresses hypothesis one (H1) consists of five main parts: hypothesised theoretical SEM for research hypothesis one (12.2.1), confirmatory factor analysis (CFA, 12.2.2), longitudinal cross-lagged SEM path analysis (12.2.3), multi-group analysis of the final longitudinal cross-lagged SEM (12.2.4) and a summary of the all the SEM for hypothesis one (12.2.5).

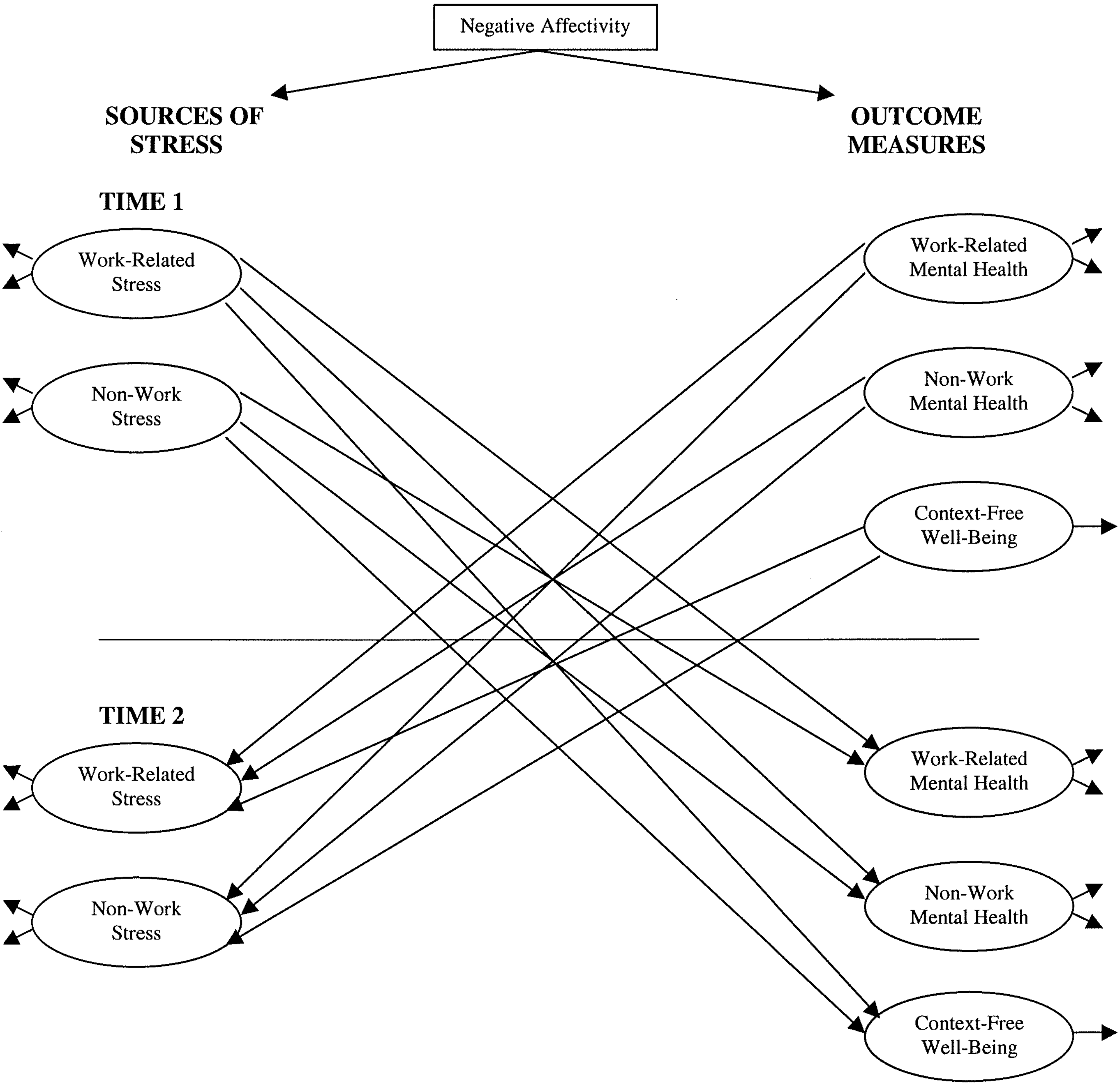
12.2.1 Hypothesised Theoretical Structural Equation Model for Research Hypothesis One

Figure 3.1 represents the SEM hypothesised model for H1:

H1: There is a reciprocal relationship between stress and well-being in the workplace, non-work and context-free domains of life.

Circles represent latent variables and arrows directed away from the latent variables symbolise the number of observed factors related to that particular latent variable for both sources of stress and outcome measures across two time phases. For example, work-related stress has two arrows representing workload and interpersonal conflict and work-related mental health also has two arrows reflecting workplace competence and aspiration. The following section (12.2.2) shall systematically outline which items from the appropriate scales represent their first order latent variables and where relevant second-order latent variables. Cross-lagged arrows directed from latent variables at time one (T1) to latent variables at time 2 (T2) represent causal paths between stress and well-being across work, non-work and context-free domains. All arrows estimated simultaneously reflect a reciprocal model of association put forward in H1. As with all the analysis, negative affectivity is introduced into the final model to be controlled for as a third variable. The hypothesised SEM model put forward in Figure 3.1 does not display error residuals for all observed variables. Although error will be measured and incorporated into all SEM analysis within Chapter Twelve, they have been omitted in Figure 3.1 due to the complexity of the model in an attempt to simplify the pictorial understanding of the model (see Williams & Podsakoff, 1989).

Figure 3.1: Hypothesised Theoretical Structural Equation Model for Research Hypothesis One



Because work and non-work mental health (competence and aspiration) and work and non-work affective well-being (anxiety contentment and depression-enthusiasm) have been measured within the current study, a second model has been designed to compliment the hypothesised theoretical model (see Appendix 3.1).

12.2.2 Confirmatory Factor Analysis of the Measurement Models

Before conducting the analysis in section 12.2.2.1 through to 12.2.2.8, the following section will outline numerous issues concerned with the estimation and procedure of the CFA for the measurement model of H1. The CFA should also be read in conjunction with Chapter Eight, which discusses in depth the content of the questionnaire measures used in the analysis (i.e. the following sections will not discuss again in great detail items and factors for related to each scale).

As with most SEM analysis, CFA is estimated firstly to ensure that the measurement model has good fit to the data and thus indicating that the scales used within the causal models reflecting H1-H3 are psychometrically acceptable. This section in a way carries on from SECTION B: METHODOLOGY (Chapter Nine) in which all scales from both the university staff questionnaire and the working/non-working students & trainee nurses questionnaire underwent an extensive psychometric analysis mainly addressing issues of internal reliability.

All scale measurements used within H1 from the working/non-working students and trainee nurses sample were normally distributed and contained a large sample size of

1235. This sample size is considered acceptable in order to draw accurate inferences in confirmatory factor analysis (Broomsma, 1983).

All cases/participants will be excluded from the analysis where there is missing data.

To examine the stability of the eight measurement models incorporated within H1, CFA was conducted applying maximum likelihood estimation to the covariances using AMOS 4.0 (Arbuckle and Wothke, 1999).

A number of statistics were used to evaluate the goodness-of-fit of the measurement models. Similar fit indices that have been used within previous studies related to the present research shall also be incorporated within the present study (see for example, Guppy et al, 2003 and Frone et al, 1992). Thus, the chi-square statistic, the goodness of fit index (GFI; Joreskog & Sorbom, 1988), and the Normed Fit Index (NFI; Mulaik, James, Van Alstine, Bennett, Lind & Stilwell, 1989) shall be explored. Although these fit indices are widely used, it is recommended that researchers report several fit indices (Bollen & Long, 1993, Medsker, Williams & Holahan, 1994 and Tanaka, 1993). Therefore, the comparative fit index (CFI; Bentler, 1990) is also reported.

The chi-square statistics should ideally be non-significant indicating that there is no difference between the CFA model and the data. According to Carmines & McIver (1981), chi-square values less than three suggest an acceptable fit to the data for the ratio of the chi-square statistic to its associated degrees of freedom (also see Daniels, Brough, Guppy, Peters-Bean & Weatherstone, 1997). Kline (1998) notes that although no exact guideline exists, a ratio below three involving dividing the chi-square statistic by the degrees of freedom is considered acceptable. However, numerous authors have suggested that chi-square has limitations in that good-fitting models can be rejected on the basis of trivial misspecifications in large samples (Bentler, 1990, Bollen & Long, 1993, Cook & Heppner, 1997, Edwards & Baglioni, 1993 and Tabachnick & Fidell, 1996). This may be the case within the present large sample of pooled working/non-working students and trainee nurses. Nevertheless, it has been recommended that the chi-square statistic should be estimated (Bollen, 1989). Alternatively, fit indices seem to be a preferable calculation in determining model fit where large sample sizes are used (Bentler, 1995) like within the current study.

It seems that the accepted criterion for establishing model fit is somewhat unclear within the literature. For example, Bentler & Bonnet (1980) suggest that fit indices that approach 0.90 represent acceptable fit and values of 0.90 or higher are generally seen as indicative of a good fit. However, other authors suggest that a criterion of 0.95 maybe more fitting (Hu & Bentler, 1999) or that the value should depend upon model complexity (Rensvold & Cheung, 1998). The accepted criterion value for establishing model fit should be considered throughout the results within the present research.

Where there is more than one latent factor reflecting a particular scale, second-order CFA models shall be analysed. That is to say, the first-order factors are explained by some higher order structure (see Bryne, 2001). For example, in the case of the work-related stress measure in the following section 12.2.2.1 there are two subscales or first-order factors representing workload and interpersonal conflict (containing four and five observed items respectively). In second-order CFA estimation, these two subscales are represented by one single second-order latent factor representing general work-related stress. However, where there is only one factor representing the observed items in a measurement model (for example, context-free well-being), obviously first-order CFA models will be conducted. The rationale to perform second-order CFA models (where appropriate) is that single second-order latent variables that represent general themes/constructs (such as work-related stress) shall be used to estimate the cross-lagged SEM causal models later in the analysis for H1-H3 (see Figure 3.1). This reduces the potential number of causal pathways between latent variables, which if were using first-order variables would be over complex. It would therefore seem appropriate and fitting to conduct second-order CFA models considering the number of variables contained within the SEM path model, the fact that the model is longitudinal and that the model shall be estimated across three life domains. Thus, second-order CFA within the present research makes future causal path analysis less complex and more parsimonious. Further justification for using this analytic approach can be seen in studies by Hart et al (1995) and Hart (1999) who also incorporated second-order CFA measurement models into their research.

It should be noted throughout the SEM analysis within Chapter Thirteen that all models shall be kept as simple as possible (Dormann & Zapf, 2002). For example, when conducting CFA measurement models (and to some extent the SEM causal models), modifications to the models if initially exhibit good fit shall be kept to a minimum since all the scales used within the questionnaire have been used within the stress literature for many years and most have been proven to be reliable and valid. Moreover, MacCallum et al, (1992, reference in Bryne) cautioned that "when an initial model fits well, it is probably unwise to modify it to achieve even better fit because modifications may simply be fitting small idiosyncratic characteristics of the sample." Another reason for not modifying an already good fitting model is that the primary aim of the current analysis is to examine the longitudinal cross-lagged structural equation path model analysis within each hypothesis not simply the measurement model. Furthermore, the full measurement model estimated within the CFA sections of the analysis for all hypothesis (H1-H3) will not be exactly replicated within the longitudinal cross-lagged SEM path analysis. This issue shall be discussed further within section 12.2.3.

The information within the present section 12.2.2 regarding the procedure for the CFA of the measurement models will be consistent across all CFA throughout Chapter Twelve across H1-H3.

12.2.2.1 Work-Related Stress

Second-order CFA was conducted to test the measurement model of the Interpersonal Conflict at Work Scale (ICAWS; Spector & Jex, 1998) consisting of four observed items and the Quantitative Workload Inventory (QWI; Spector & Jex, 1998) consisting of five items. See Chapter Eight (section 8.6.1.3) for a discussion on the scales item and factor content. The first order latent variables represent both the ICAWS and the QWI whilst the higher second order latent factor reflects general work-related stress. Both error and residual variables have been constrained to identify the model and account for any influences on their respective variables referred to as error of measurement (see Bryne, 2001). Regression weights have also been constrained as standard procedure. See Appendix 3.2 for an AMOS graphical representation of the outcome of the analysis (observed variables workstr1-workstr9 represents items 1-9 in the questionnaire).

The chi-square test was statistically significant with a value of 333.92 (df = 26) which produced a ratio above three involving dividing the chi-square statistics by the degrees of freedom. This indicates poor fit, but as mentioned earlier, this may be due to the large sample of pooled working/non-working students and trainee nurses incorporated within the analysis. However, more importantly the three goodness of fit statistics provided a strong fit to the data (GFI = .94, NFI = .91, and CFI = .91) thus indicating that the second order workplace stress measurement model incorporated within the current analysis strongly fits the data from the working/non-working students & trainee nurses sample. Standardised regression weights (factor loadings) representing both first order latent variables range from .51 to .81 across the nine items. Regression weights for the second order factor of work-related stress is .30 for the ICAWS and .52 for the QWI. No modifications to the model were necessary as discussed within the previous section (13.2.2).

12.2.2.2 Non-Work Stress

Similarly to the work-related stress model, a second-order CFA was performed this time to examine the measurement model of stress in non-working life. Both scales derive again from Spector & Jex (1998). However, only two observed items now reflect interpersonal conflict and three items representing quantitative workload. See Chapter Eight once again (section 8.6.2.3) for a discussion on the scales item and factor content. The first order latent variables represent interpersonal conflict and quantitative workload both outside of work. The higher second order factor represents general non-work stress. Both error and residual variables have been constrained to make the model identified as well as the regression weights as standard procedure (see Bryne, 2001). See Appendix 3.3 for an AMOS graphical representation of the outcome of the analysis (observed variables nonwstr1-nonwstr5 represent items 1-5 in the questionnaire).

The chi-square test was statistically significant with a value of 44.64 (df = 4). Moreover, the three goodness of fit statistics provided an excellent fit to the data (GFI = .98, NFI = .98, and CFI = .98) thus indicating that the second order non-work stress measurement model incorporated within the current analysis strongly fits the data from the working/non-working students & trainee nurses sample. Regression weights reflecting both first order latent variables range from .71 to .85 across the five items. Regression weights for the second order factor of non-work stress is .54 for the ICAWS and .61 for the QWI. No modifications to the model were necessary as discussed within the previous section (12.2.2).

12.2.2.3 Work-Related Mental Health

Second-order CFA was also performed to examine the measurement model of Warr's (1990) work-related competence and work-related aspiration scales both consisting of four observed items. Since within section 12.2.4 multi-group analysis will be conducted on both the current sample of students/nurses as well as the university staff sample, four items per scale (university staff questionnaire) as opposed to six items (working/non-working students questionnaire) shall be estimated so that both groups have the same measurement model item content. See Chapter Eight (section 8.6.1.1) for a discussion on the scales item and factor structure. The first order latent variables reflect both the competence and aspiration scales. The higher second order latent factor reflects overall general work-related mental health which encompasses both first order concepts. See Appendix 3.4 for a graphical representation of the analysis (observed variables workwel1-workwel11 represent the items that represent the associated two factors in the questionnaire with r representing reversed scored items).

The chi-square test was statistically significant with a value of 131.22 (df = 19). Regardless, the three goodness of fit statistics produced a strong fit to the data (GFI = .97, NFI = .84, and CFI = .86) therefore revealing that the second order workplace mental health model acceptably fits the data. Standardised regression weights (factor loadings) reflecting both first order latent variables range from .33 to .55 across the eight items. Regression weights for the second order factor of work-related mental health are strong at .85 for the competence measure and .66 for the aspiration scale. No modifications to the model were necessary as discussed within the previous section (12.2.2).

12.2.2.4 Non-Work Mental Health

Again, second-order CFA was estimated to analyse the factor model of Warr's (1990) non-work competence and non-work aspiration measures, both of which contain four observed items. Section 8.6.2.1 of Chapter Eight outlines both scales item and factor structure. The first order latent variables reflect both the competence and aspiration scales. The second order latent factor reflects general non-work mental health which encompasses both first order concepts. Both error and residual variables have been constrained to identify the model and account for any confounding influences on their respective variables referred to as error of measurement. See Appendix 3.5 for a graphical representation of the findings from the CFA (observed variables nonwwell1-nonww10r represent the items that represent the associated two factors in the questionnaire, with r reflecting reversed items).

The chi-square test was statistically significant with a value of 149.55 (df = 19). Nonetheless, the three goodness of fit statistics provided an acceptable fit to the data (GFI = .97, NFI = .89 and CFI = .90) thus showing that the second order non-work mental health model fits the data from the working/non-working students & trainee nurses sample well. Standardised regression weights reflecting the first order latent variables range from .30 to .75 across all items. Factor weights for the second order factor of non-work mental health are strong at .92 for the non-work competence measure and .70 for the non-work aspiration variable. No modifications to the model were necessary once more.

12.2.2.5 Work-Related Affective Well-Being

Second-order CFA was conducted to test the measurement model of Warr's (1990) workplace affective well-being measure which consists of two four items scales (work-related anxiety-contentment and work-related depression-enthusiasm). See Chapter Eight (section 8.6.1.2) for a discussion on the two scales item and factor structure. The first order latent variables represent both the anxiety-contentment and the depression-enthusiasm scales whilst the higher second order latent factor reflects general work-related affective well-being. Both error and residual variables have been constrained to identify the model and account for any influences on their respective variables referred to as error of measurement. Regression weights have also constrained as standard procedure. See Appendix 3.6 for an AMOS graphical representation of the outcome of the analysis (observed variables workaf1r-workaff8 represent items 1-8 in the questionnaire with letter r representing reversed items).

The chi-square test was statistically significant with a value of 1605.12 (df = 19) which revealed a ratio above three involving dividing the chi-square statistics by the degrees of freedom. This indicates poor fit, but as discussed earlier within section 12.2.2, this may be due to the large sample of pooled working/non-working students and trainee nurses incorporated within the analysis. Moreover, and more importantly, the three goodness of fit statistics also provided a poor fit to the data (GFI = .73, NFI = .60 and CFI = .61) thus suggesting that the second order workplace affective well-being measurement model used within the present analysis does not fit the data from the working/non-working students & trainee nurses sample. Regression weights representing first order latent variables for this model range from .32 to .86 across the eight items. Regression weights for the second order factor of work-related affective well-being is .77 for anxiety-contentment and .86 for depression-enthusiasm.

Since this model produced an unacceptable fit to the data, modification indexes (MI) shall now be examined to locate the source of the misfit. In reviewing the MI, error covariances between items three and four and seven and eight are large. Error correlations between pairs of items can be an indication of redundancy in item content (Bryne, 2001). Based upon the substantial rationale that items three and four represent calm and relaxed and items seven and eight reflect enthusiastic and optimistic respectively within the working/non-working students and trainee nurses questionnaire (see Appendix 2.4, SECTION 1: part (b)), it is considered appropriate to re-estimate the work-related affective well-being model with error covariances specified between items three and four and items seven and eight.

The chi-square was again statistically significant with a reduced value of 204.84 (df = 17). The three goodness of fit statistics however provided a good fit to the data (GFI = .96, NFI = .95 and CFI = .95) thus indicating that the modified second order workplace affective well-being measurement model with two additional modified error correlations incorporated within the current analysis does fit the data from the working/non-working students & trainee nurses sample. The re-assessed regression weights representing first order latent variables for this model now range from .25 to .90 across the eight items.

Regression weights for the second order factor of work-related affective well-being is .74 for anxiety-contentment and .87 for depression-enthusiasm (see Appendix 3.6a).

12.2.2.6 Non-Work Affective Well-Being

Second-order CFA was performed to investigate the measurement model of this time Warr's (1990) non-work affective well-being measure which similarly to the workplace affective well-being model consists of two four items scales (non-work anxiety-contentment and non-work depression-enthusiasm). See Chapter Eight (section 8.6.2.2) for further information on the two scales. The first order latent factors reflect the non-work anxiety-contentment and the depression-enthusiasm scales. The higher second order factor symbolises overall non-work affective well-being. Appendix 3.7 shows the graphical representation of the outcome of the analysis (observed variables nonwaf1r-nonwaff8 represent items 1-8 in the questionnaire with letter r representing reversed items).

The chi-square test was statistically significant at 2082.16 (df = 19) which shows a ratio above three involving dividing the chi-square by its associated degrees of freedom. The three goodness of fit statistics provided inadequate fit to the data (GFI = .66, NFI = .56 and CFI = .56) indicating that the second order non-work affective well-being measurement model does not fit the data within the current analysis. Regression weights reflecting the two first order latent variables range from .38 to .87. Regression weights for the second order latent construct of non-work affective well-being is .80 for anxiety-contentment and .95 for depression-enthusiasm.

Similarly to work-related affective well-being within section 13.2.25, the current model exhibited poor fit to the data. Therefore, modification indexes (MI) shall now again be explored to locate the source of the misfit. In reviewing the MI, once again error covariances between items three and four and seven and eight are extremely large. Based upon the theoretical rationale that items three and four represent calm and relaxed and items seven and eight reflect enthusiastic and optimistic respectively like within the work-related affective well-being scale (see Appendix 2.4, SECTION 2: part (b)), it is considered appropriate to re-estimate the non-work affective well-being model with error covariances specified between items three and four and items seven and eight.

The chi-square was significant with a reduced value of 396.71 (df = 17). The three goodness of fit statistics provided a good fit to the data (GFI = .93, NFI = .92 and CFI = .92) thus revealing that the modified second order non-job affective well-being measurement model with two additional modified error correlations incorporated within the current analysis does fit the data. The re-assessed regression weights reflecting first order latent variables for this model now range from .30 to .92 across the eight items. Regression weights for the second order factor of non-work affective well-being is .77 for anxiety-contentment and .94 for depression-enthusiasm (see Appendix 3.7a for a representation of the final model).

12.2.2.7 Context-Free Well-Being

First-order CFA was conducted to test the measurement model of the General Health Questionnaire (GHQ; Goldberg, 1972) which consists of eight observed items. Since similarly within section 12.2.4 multi-group analysis shall be performed on both the current sample of students/nurses as well as the university staff sample, this measure will consist of eight items (working/non-working students and trainee nurses questionnaire) as opposed to 12 items (university staff questionnaire) so that both groups have the same measurement model item content. See Chapter Eight (section 8.6.3.2) for a discussion on the scale item and factor content. The single first order latent variable represents the only latent construct. There is no higher second order latent factor since the scale represents one single factor reflecting context-free well-being. Error variables have been constrained to identify the model and account for any influences on their respective observed variables referred to as error of measurement (see Bryne, 2001). Regression weights have also been constrained as standard procedure. See Appendix 3.8 for an AMOS graphical representation of the outcome of the analysis (observed variables contghq1-contghq8 represent items 1-8 in the questionnaire).

The chi-square test was statistically significant with a value of 163.94 (df = 20) which produced a ratio above three involving dividing the chi-square statistics by the degrees of freedom. This indicates poor fit, nonetheless, this may be due to the large sample of pooled working/non-working students and trainee nurses incorporated within the analysis. More importantly the three goodness of fit statistics provided a strong fit to the data (GFI = .96, NFI = .94 and CFI = .94) thus indicating that the first order context-free well-being measurement model incorporated within the current analysis strongly fits the data from the working/non-working students & trainee nurses sample. Standardised regression weights (factor loadings) representing the single first order latent variable range from .41 to .78 across the eight items. No modifications to the model were necessary as discussed within the previous section (12.2.2).

12.2.2.8 Negative Affectivity

Lastly for H1, first-order CFA was performed to examine the measurement model of the negative affectivity neuroticism scale (Eysenck et al, 1985) which contains four observed items. See Chapter Eight (section 8.6.3.1) for further information on the scale item content etc. The single first order latent variable reflects the only latent variable in the model. Similarly to context-free well-being (section 12.2.2.7) there is no second order latent variable since the scale represents only one single factor reflecting context-free negative affectivity. Factor weights have also been constrained as standard procedure. See Appendix 3.9 for an AMOS graphical representation of the outcome of the analysis (observed item variables contna1-contna4 reflect items 1-4 in the questionnaire).

The chi-square test was statistically significant with a value of 22.38 (df = 2) which exhibited a ratio above three involving dividing the chi-square statistics by the degrees of freedom. However, the three goodness of fit statistics provided a strong fit to the data (GFI = .99, NFI = .98 and CFI = .98) thus revealing that the first order general everyday negative affectivity measurement model used within the present analysis strongly fits the data from the working/non-working students & trainee nurses sample. Standardised regression weights representing the latent variable range from .48 to .79 across the four items. Due to good fit there are no modifications to the model.

All measurement models used within the current analysis to address H1 all have good to strong fit to the data from sections 12.2.2.1 through to 12.2.2.8. Table 3.6 summarises the results of the CFA measurement model for all scales incorporated within the present analysis for H1.

Table 3.6: Summary of all the Confirmatory Factor Analysis Measurement Models for Hypothesis One: Chi-Square & Goodness of Fit Statistics

Measurement Model	Chi2	d.f.	GFI	NFI	CFI
Work-Related Stress	333.92	26	.94	.91	.91
Non-Work Stress	44.64	4	.98	.98	.98
Work-Related Mental Health	131.22	19	.97	.84	.86
Non-Work Mental Health	149.55	19	.97	.89	.90
Work-Related Affective Well-Being	204.84	17	.96	.95	.95
Non-Work Affective Well-Being	396.71	17	.93	.92	.92
Context-Free Well-Being	163.94	20	.96	.94	.94
Negative Affectivity	22.38	2	.99	.98	.98

12.2.3 Longitudinal Cross-Lagged Structural Equation Path Model Analysis

The hypothesised SEM in Figure 3.1 representing H1 shall now be estimated to determine whether the model fits the pooled working/non-working students and trainee nurses data. As with all standard SEM analysis as mentioned previously, models that have initial good fit shall not be modified unless there is theoretical justification to do so. Thus, Arbuckle (1999) quotes: "A modification must only be considered if it makes theoretical and common sense." The same fit indice statistics used within the confirmatory factor analysis will also be used for the path model analysis throughout section 12.2. All longitudinal models throughout section 12.2.3 have sample sizes of 179.

Note that all models throughout section 12.2.3 shall be estimated by examining causal pathways between both first order latent factors (context-free well-being) and second-order latent factors (work-related stress and mental health and non-work stress and mental health) as measured within the previous CFA section (12.2.2). Thus, the second order CFA conducted is now justified as the following SEM causal model shall incorporate these constructs. Arrows reflect the associated subscale(s) within a measure (e.g. work-related stress has two subscales: workload and interpersonal conflict shown in Figure 3.1 with two arrows). However, in order to make the model more coherent and less complex, the observed items reflecting each measure have been scored to reflect a single condensed observed factor representing the related subscale(s). This SEM procedure appears to be the best approach in dealing with the current studies data as the scales used have been empirically researched and found to be valid and reliable. This analytic procedure used within the current research has also been recommended by various authors who acknowledge the difficulty of dealing with complex longitudinal models that contain a high number of observed and latent variables (see in particular; Williams & Podsakoff, 1989). The following authors incorporate similar longitudinal SEM analysis and theoretical issues that is used within the present study to address H1 where multiple item indicators have been scored and use second order factors: Hart et al (1995), Hart (1999) and Frone et al (1992).

As mentioned earlier, Figure 3.1 does not display error residuals as well as associated observed scored subscales for all variables across both time points. They have been removed from Figure 3.2 and all other models due to the complexity of the model in order to simplify understanding. However, error shall be measured within all SEM analysis within Chapter Twelve. Covariances shall be imposed between error residuals that are related to observed variables that are the same between domains (for instance, covarances will be estimated between work-related competence and non-work competence residuals). Since the following analysis is longitudinal, it is also viable in SEM to constrain error, which represents all the observed scored variables over time phases where appropriate. Thus, within Figure 3.4, residual error covariance reflecting the repeated observation of all variables shall be imposed (see Maruyama, 1998). Bijleveld et al (1998) notes "it is conceptually viable to impose particular constraints on the parameters, reflecting the repeated observation of the variables. For instance, if we have measured several indicators of one construct variable repeatedly, it makes sense to assume that these criterion variables reflect the latent variable in the same manner at every time point (otherwise the latent variable has a different interpretation at each time point)". See Williams & Podsakoff (1989), Farrell (1994) and Maruyama (1998) who also incorporate correlated errors over time in their research. Furthermore, the standard procedure of incorporating residual errors on the endogenous latent variables at time point two will also be implemented.

Dormann & Zapf (2002) suggest that complex models require huge sample sizes in order to test a whole longitudinal model and therefore smaller less complex models testing relationships between a smaller number of variables if preferable. Similarly to De Jonge et al (2001), a number of competing models shall be estimated in a number of sequential steps in order to address H1:

Model A: a cross-lagged model with one-way structural paths from time one (T1) sources of stress (work-related stress and non-work stress) to time two (T2) outcome measures (work-related mental health, non-work mental health and context-free well-being).

Model B: a cross-lagged model with reverse structural paths from time one (T1) outcome measures (work-related mental health, non-work mental health and context-free well-being) to time two (T2) sources of stress (work-related stress and non-work stress).

Model C: a reciprocal cross-lagged model with one-way and reverse structural paths from time one (T1) sources of stress and outcome measures to time two (T2) sources of stress and outcome measures (simultaneously representing both Model A and Model B).

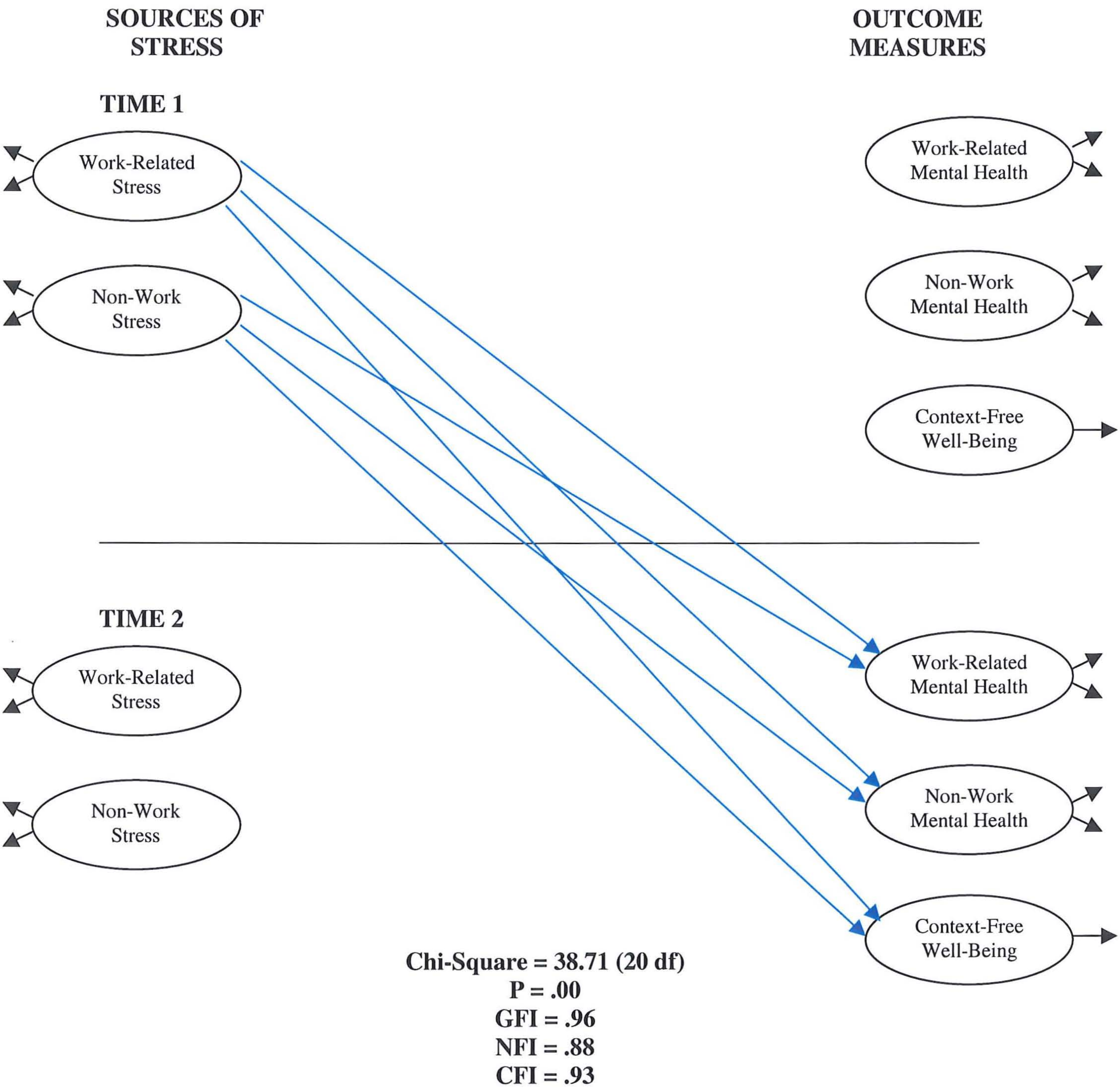
The above analytic procedure will then be replicated with similar associated variables to reflect affective well-being as mentioned earlier (see sections 12.2.3.4, 12.2.3.5 and 12.2.3.6). A summary of all model comparisons reflecting H1 shall then be discussed. Once the best fitting model has been established, negative affectivity will then be introduced within the model in order to control for confounding third order effects before any further analysis. The final best fitting model will then be put forward for multi-group analysis within the following section 12.2.4. Since the model in Figure 3.2 is longitudinal, as well as the related models, sample size has been reduced to 194 throughout the analysis within section 13.2.3.

12.2 3.1 Model A

Since we are solely interested in the causal paths within Model A at this stage, analysis shall focus upon the chi-square statistic, fit indices and the regression weights which are directly related to answer the research question within Model A and moreover H1.

The "critical" relationships of interest in relation to Model A are represented by the six blue arrows which attempt to address the one-way cross-lagged relationship between stress and well-being across work, non-work and context-free domains of life (see Figure 3.2). The chi-square statistic for Model A was significant at 38.88 (19 df). However, chi-square has limitations in that good-fitting models can be rejected on the basis of trivial misspecifications. Alternatively, goodness of fit indice statistics were examined and produced good fit indicating that Model A fits the working/non-working students and trainee nurses data set (GFI = .96 NFI = .88 and CFI = .93).

Figure 3.2: Estimated Longitudinal Cross-Lagged Structural Equation Model for Research Hypothesis One: Model A



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work-related stress and mental health (-.65). The same pattern of associations was consistent for the non-work stress and the three well-being constructs[1].

Table 3.7: Summary of the Standardised Regression Weights for the Longitudinal Cross-Lagged Structural Equation Model for Research Hypothesis One: Model A

Standardised Regression Weights	Estimates
Work-Related Stress > Work-Related Mental Health	-.65
Work-Related Stress > Non-Work Mental Health	-.50
Work-Related Stress > Context-Free Well-Being	.88
Non-Work Stress > Work-Related Mental Health	-.17
Non-Work Stress > Non-Work Mental Health	-.31
Non-Work Stress > Context-Free Well-Being	.47

Since the fit of Model A is good, the current analysis will not pursue the possibility of alternative model modifications. Arbuckle (1999) argues that one should not be guided exclusively by modification indices in trying to improve model fit. Performing model modifications would also alter the initial hypothesised model, which is not the objective of the current analysis.

12.2 3.2 Model B

To refresh, Model B shall estimate the reverse structural paths from T1 outcome measures (work-related mental health, non-work mental health and context-free well-being) to T2 sources of stress (work-related stress and non-work stress).

Interest in relation to Model B are now reflected by the six blue arrows which this time concern the reverse cross-lagged relationship between stress and well-being again across work, non-work and context-free domains of life. The initial estimation chi-square

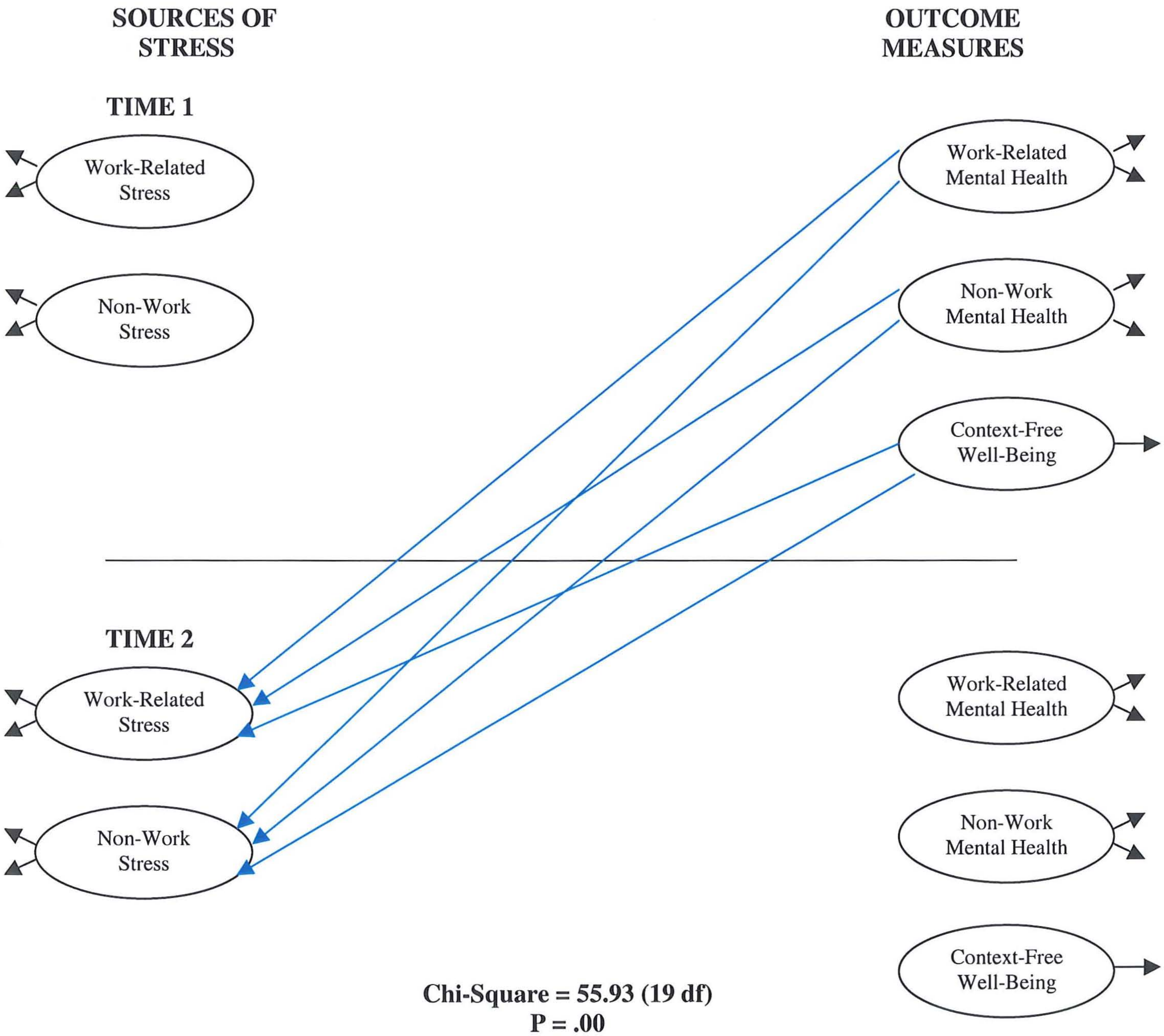
[1] AMOS does not produce indication of significant regression path coefficients.

statistic for Model B was significant at 110.30 (19 df). Goodness of fit indice statistics produced a poor fit indicating that Model B does not fit the working/non-working students and trainee nurses data set (GFI = .88, NFI = .65 and CFI = .67).

However, upon inspection of the modification indices it was noted that residual error covariances between both work-related competence and context-free well-being and non-work competence and context-free well-being at T1 would improve model fit considerably if imposed. Theoretically these modifications to Model B are also justified, as it appears reasonable to assume that error from the three well-being observed variables across the three domains are correlated.

Thus, with the additional two constraints the chi-square statistic for Model B was nevertheless still significant at 55.93 (19 df). However, this is a significant difference from the initial model of 54.37. Fit indice statistics now produced acceptable to good fit suggesting that Model B does fit the data (GFI = .94, NFI = .84 and CFI = .88). See Figure 3.3.

Figure 3.3: Estimated Longitudinal Cross-Lagged Structural Equation Model for Research Hypothesis One: Model B



Chi-Square = 55.93 (19 df)
P = .00
GFI = .94
NFI = .84
CFI = .88

Table 3.8 displays the standardised regression weights for the six structural paths estimated for Model B. Again, all of the causal associations between variables are in the expected direction (positive or negative). For example, all work-related and non-work related mental health variables have a negative relationship with work-related and non-work related stress (i.e. higher levels of mental health within work and non-work contexts are related with lower levels of stress within work and non-work contexts). Similarly, context-free well-being has a positive relationship with both work and non-work stress (i.e. lower levels of mild mental illness within a context-free domain are associated with lower levels of stress within both work and non-work domains).

Regression weights for the whole model range from .12 to .84. The strongest causal pathways within the model are the two context-free well-being variables with their associated work and non-work stress scales (.67 and .84 respectively). Table 3.8 shows that these two causal paths have the strongest effect upon the reversed Model B. Surprisingly, the analysis would then indicate that the non-domain specific relationship between both non-work related mental health upon work-related stress (-.55) and the effects of work-related mental health upon non-work stress (-.20) are the next strongest influence. Again surprisingly, weakest causal influence were the domain specific effects of work-related mental health upon work-related stress (-.12) and non-work mental health upon non-work stress (-.12 and -.13 respectively).

Table 3.8: Summary of the Standardised Regression Weights for the Longitudinal Cross-Lagged Structural Equation Model for Research Hypothesis One: Model B

Standardised Regression Weights	Estimates
Work-Related Mental Health > Work-Related Stress	-.12
Work-Related Mental Health > Non-Work Stress	-.20
Non-Work Mental Health > Work-Related Stress	-.55
Non-Work Mental Health > Non-Work Stress	-.13
Context-Free Well-Being > Work-Related Stress	.67
Context-Free Well-Being > Non-Work Stress	.84

12.2 3.3 Model C

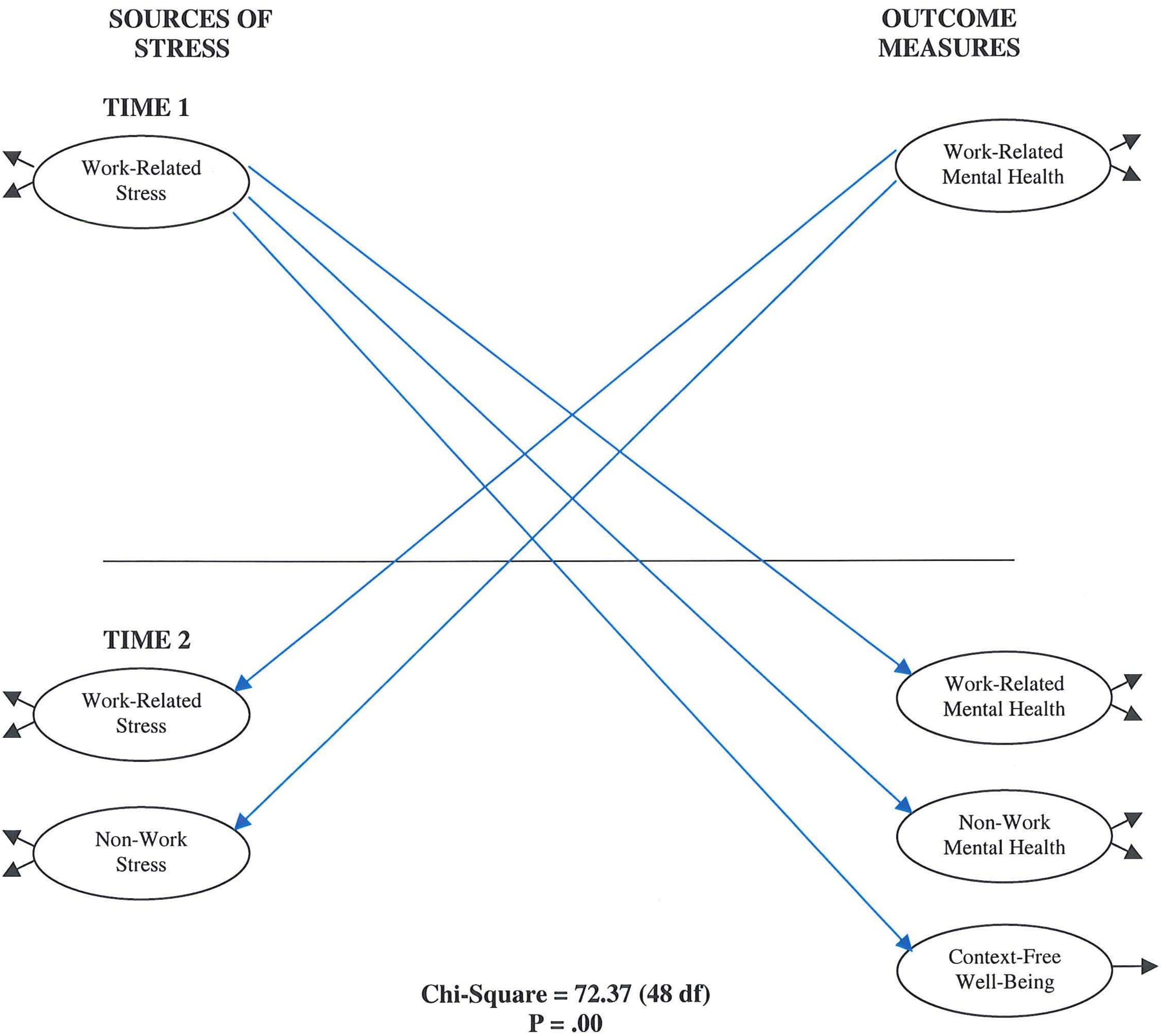
Model C will examine a reciprocal cross-lagged model with both one-way and reverse structural paths from T1 sources of stress (work-related stress) and outcome measures (work-related mental health) to T2 the same sources of stress and outcome measures. Model C partially represents both Model A and Model B simultaneously.

Non-work stress, non-work mental health and context-free well-being variables at T1 were not introduced into the model as too many variables/parameters within the model associated with the degrees of freedom would introduce identification problems in that the unique set of parameters would not be consistent with the data (Bryne, 2001). Justification for not incorporating particular scales within a model was put forward by Biijleveld et al (1998) who note regards identification that whenever a model has more free parameters than the number of observed variances and covariances the model is unidentified. Also they state in relation to sample size that the more complex the model and the greater the number of variables, the larger the sample size is needed for good fit. Similarly the model of Mohr (1986 and 1991, see Dormann & Zapf, 2002, pp35 for full reference) is somewhat complex and therefore a huge sample size would be required to estimate the whole longitudinal model. Thus, the current Model C has been reduced accordingly.

Since it would appear theoretically that there would be an association between the exogenous variables of work-related stress and work-related mental health at T1, covariance between the two variables has been estimated within the model. Also, it would seem that estimating error covariances between the same observed variables across both time phases where appropriate is theoretically and statistically justified as both variables are measuring the same concept which are therefore stable.

The relationships of interest within Model C are represented by the now five blue arrows which address both the one-way and reverse reciprocal cross-lagged associations between stress and well-being at work at T1 and across work, non-work and context-free domains of life at T2 (see Figure 3.4). The chi-square statistic for Model C was significant at 72.37 (48 df). Goodness of fit statistics produced an excellent fit indicating that Model C does fit the working/non-working students and trainee nurses data set (GFI = .95 NFI = .92 and CFI = .97). Inspection of the model modification suggested that there were no theoretically justified amendments to be made to Model C.

Figure 3.4: Estimated Longitudinal Cross-Lagged Structural Equation Model for Research Hypothesis One: Model C



Chi-Square = 72.37 (48 df)
P = .00
GFI = .95
NFI = .92
CFI = .97

All of the negative and positive relationships between variables are in the expected direction. For example, all work-related stress variables have a negative relationship with work-related and non-work related mental health (i.e. lower levels of stress within work are associated with greater levels of mental health/well-being within work and non-work contexts). Similarly, work-related stress is positively associated with context-free well-being (i.e. lower levels of stress within work are associated with lower levels of the signs of mental illness within a context-free domain).

Table 3.9 shows the regression weights for the 5 causal pathway estimated simultaneously for Model C. Regression weights for the model range from -.55 to -.95. The strongest relationship within the model is the causal pathway from work-related stress to context-free well-being (.95). Table 3.9 shows that this causal path has the strongest effect upon reciprocal Model C. Thereafter, the domain-specific causal influences of work-related stress upon work-related mental health (-.90) and work-related mental health upon work-related stress (-.93) had the next greatest effect. Nevertheless, the two remaining non-domain specific relationships within Model C also produced quite strong standardised regression coefficients with work-related stress upon non-work mental health at -.59 and work-related mental health upon non-work stress similarly at -.55

Table 3.9: Summary of the Standardised Regression Weights for the Longitudinal Cross-Lagged Structural Equation Model for Research Hypothesis One: Model C

Standardised Regression Weights	Estimates
Work-Related Stress > Work-Related Mental Health	-.90
Work-Related Stress > Non-Work Mental Health	-.59
Work-Related Stress > Context-Free Well-Being	.95
Work-Related Mental Health > Work-Related Stress	-.93
Work-Related Mental Health > Non-Work Stress	-.55

12.2 3.4 Model A1

As mentioned earlier, both work and non-work mental health (competence and aspiration) and work and non-work affective well-being (anxiety-contentment and depression-enthusiasm) have been investigated within the present research. Thus, a second set of accompanying longitudinal cross-lagged structural equation path models have been constructed in an attempt to compliment H1 and Models A, B and C (see Appendix 3.1). Figure 3.5 therefore replaces work and non-work mental health with work and non-work affective well-being to further strengthen findings for H1.

Similarly, Model A1 (Figure 3.5) has been estimated by investigating causal pathways between both first order and second order latent factors. Arrows reflecting the latent variables work affective well-being and non-work affective well-being at time point two consist of two scored subscales (work and non-work anxiety-contentment and work and non-work depression-enthusiasm). Error residuals are again included within the model. Covariance errors shall again also be imposed between observed variables that are the same between domains (for instance, a covariance error will be estimated between work-related interpersonal conflict and non-work interpersonal conflict at T1 within Model A1).

Model A1 analysis is solely interested in the causal pathways within Figure 3.5. Estimation will focus upon the chi-square statistic, fit indices and the regression weights which are directly related to answer the research question associated with Model A1 and moreover H1.

The "critical" associations of interest in relation to Model A1 are represented by the six blue arrows which attempt to address a cross-lagged model with one-way structural paths from time one (T1) sources of stress (work-related stress and non-work stress) to time two (T2) outcome measures (work-related affective well-being, non-work affective well-being and context-free well-being). The chi-square statistic for Model A1 was significant at 41.84 (18 df). Alternatively, goodness of fit indice statistics were examined and produced very good fit indicating that Model A1 fits the working/non-working students and trainee nurses data set (GFI = .95 NFI = .91 and CFI = .95).

Figure 3.5: Estimated Longitudinal Cross-Lagged Structural Equation Model for Research Hypothesis One: Model A1

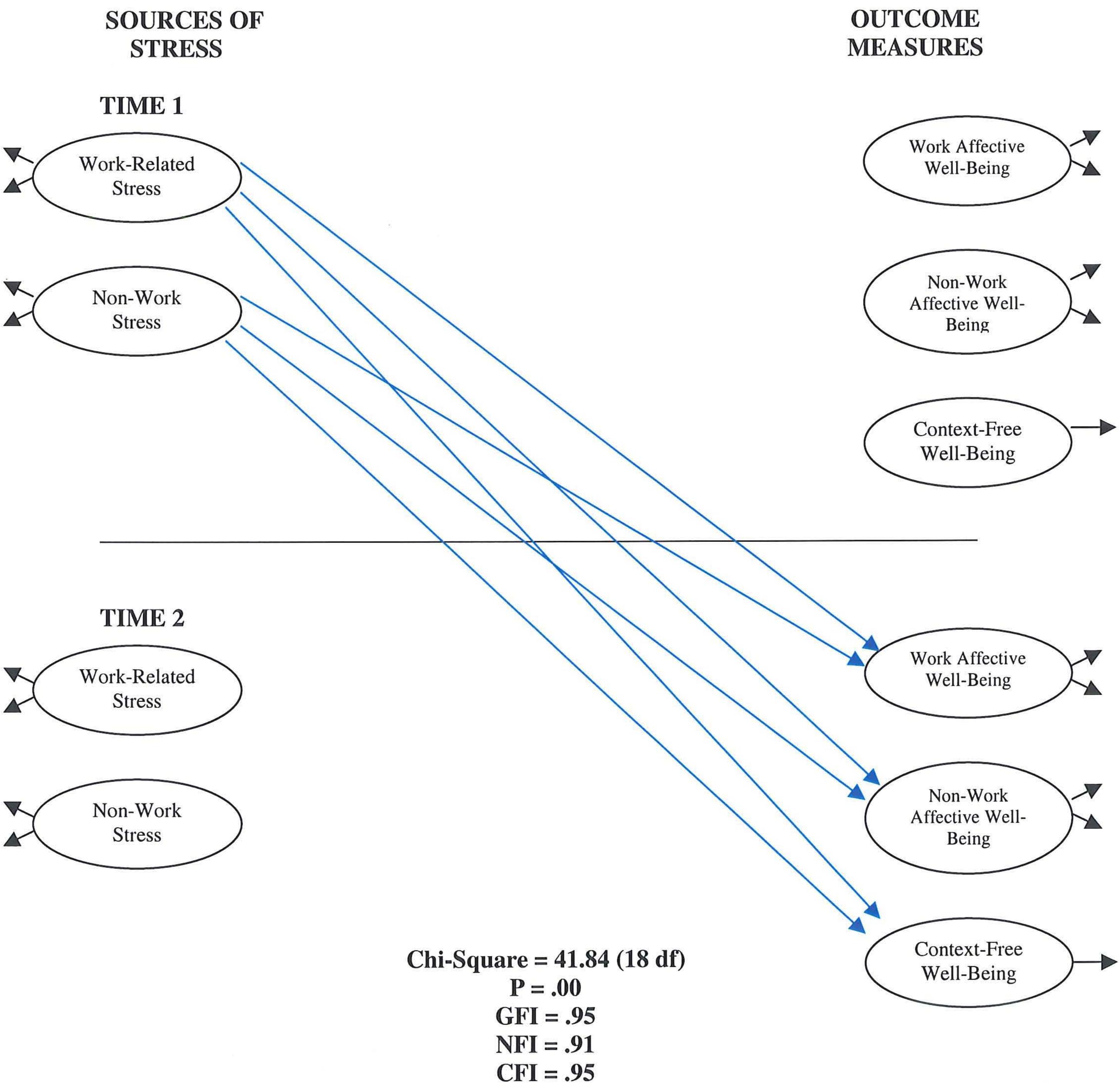


Table 3.10 shows the regression weights for all six causal pathways estimated simultaneously for Model A1. Again, all the negative and positive relationships between variables are in the expected direction. For example, all work-related and non-work related stress variables have a negative relationship with work-related and non-work related affective well-being (i.e. lower levels of stress within the work non-work domains are associated with higher levels of well-being, i.e. lower levels of anxiety-contentment and depression-enthusiasm within work and non-work contexts). Similarly, work-related stress is positively associated with context-free well-being (i.e. lower levels of stress within work and non-work are associated with lower levels of the signs of mental illness within a context-free domain).

Standardised regression weights for the whole model range from -.23 to .89. The two strongest causal pathway within the model is the influence of work-related stress and non-work stress upon context-free well-being (.89 and .45 respectively). This is followed by the two effects of workplace stress and non-work stress upon work-related affective well-being (-.45 and -.23 respectively). The least strong causal influence of work-related and non-work related stress upon non-work affective well-being, which produced standardised coefficients of -.45 and -.37 respectively. Overall, the strongest causal pathways are from the three work-related stress exogenous latent variables to the three work-related, non-work related and context-free endogenous variables in comparison to the three effects from non-work stress.

Table 3.10: Summary of the Standardised Regression Weights for the Longitudinal Cross-Lagged Structural Equation Model for Research Hypothesis One: Model A1

Standardised Regression Weights	Estimates
Work-Related Stress > Work-Related Affective Well-Being	-.66
Work-Related Stress > Non-Work Affective Well-Being	-.45
Work-Related Stress > Context-Free Well-Being	.89
Non-Work Stress > Work-Related Affective Well_Being	-.37
Non-Work Stress > Non-Work Affective Well-Being	-.23
Non-Work Stress > Context-Free Well-Being	.45

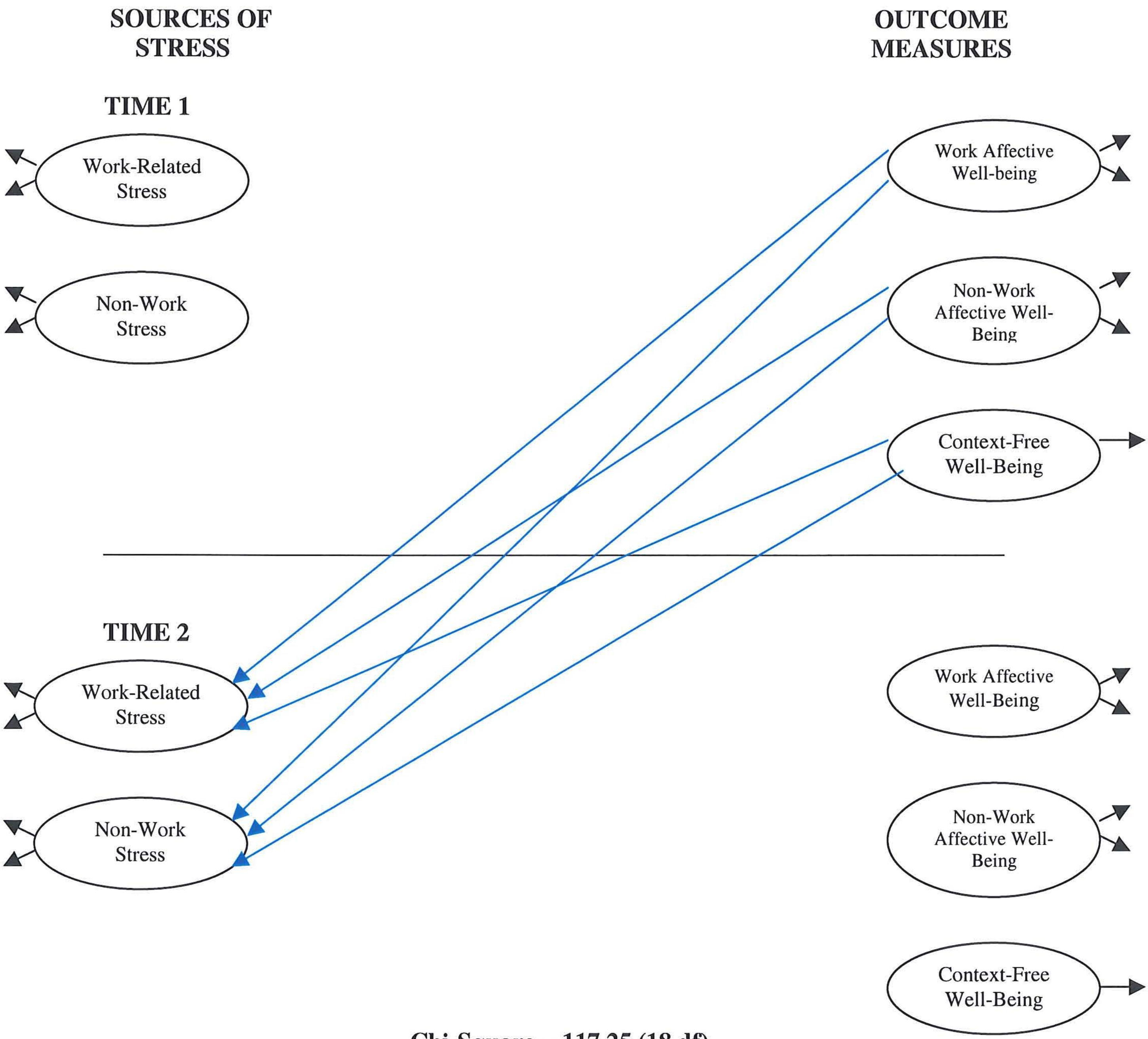
Since the fit of Model A1 is good, the present analysis will not continue the possibility of model modifications. Arbuckle (1999) argues that one should not be guided exclusively by modification indices in trying to improve model fit.

12.2 3.5 Model B1

Model B1 shall estimate the reverse structural paths from T1 outcome measures (work-related affective well-being, non-work affective well-being and context-free well-being) to T2 sources of stress (work-related stress and non-work stress).

Interesting associations in relation to Model B1 are now reflected by the six blue arrows, which this time concern the reverse cross-lagged relationship between stress and affective well-being again across work, non-work and context-free domains of life (similar to section 12.2.3.2). The error covariances between the same variables across domain for both the stress and well-being scales shall again be imposed to complimentary Model B and in order to make both models consistent and parsimonious. The chi-square statistic for Model B1 was significant at 117.25 (19 df). Goodness of fit indice statistics ranged from poor to approaching fit indicating that Model B1 doesn't quite fit the data set (GFI = .88, NFI = .76 and CFI = .78). See Figure 3.6.

Figure 3.6: Estimated Longitudinal Cross-Lagged Structural Equation Model for Research Hypothesis One: Model B1



Chi-Square = 117.25 (18 df)
P = .00
GFI = .88
NFI = .76
CFI = .78

Table 3.11 shows the regression weights for the six structural paths estimated for Model B1. All of the causal associations between constructs are in the expected positive or negative direction). For instance, work-related and non-work related affective well-being measures have a negative association with work-related and non-work related stress (i.e. higher levels of well-being within work and non-work contexts are related with lower levels of stress within work and non-work contexts). Similarly, context-free well-being has a positive relationship with both work and non-work stress (i.e. lower levels of mild mental illness within a context-free domain are associated with lower levels of stress within both work and non-work domains.

Regression coefficients for the whole of Model B1 range from -.07 to .71. The strongest causal pathways within the model are yet again associated with the two context-free well-being variables. The causal effect of these two independent variables upon work and non-work stress produced coefficients of .70 and .71 respectively. Table 3.11 also shows that the domain specific relationship between work-related affective well-being and work-related stress is the next most strong causal path (-.33). The reverse effect of non-work well-being's influence upon work-related stress produced a regression weight of -.30. Non-work affective well-being and non-work stress revealed a regression value of -.20 followed by the weakest effect within the model in which work-related affective well-beings effect upon work-related stress produced a value of -.07.

Table 3.11: Summary of the Standardised Regression Weights for the Longitudinal Cross-Lagged Structural Equation Model for Research Hypothesis One: Model B1

Standardised Regression Weights	Estimates
Work-Related Affective Well-being > Work-Related Stress	-.33
Work-Related Affective Well-Being > Non-Work Stress	-.07
Non-Work Affective Well-Being > Work-Related Stress	-.30
Non-Work Affective Well-Being > Non-Work Stress	-.20
Context-Free Well-Being > Work-Related Stress	.71
Context-Free Well-Being > Non-Work Stress	.70

There appeared to be no statistical and theoretical justification to alter Model B1 based upon inspection of the modification indices.

12.2 3.6 Model C1

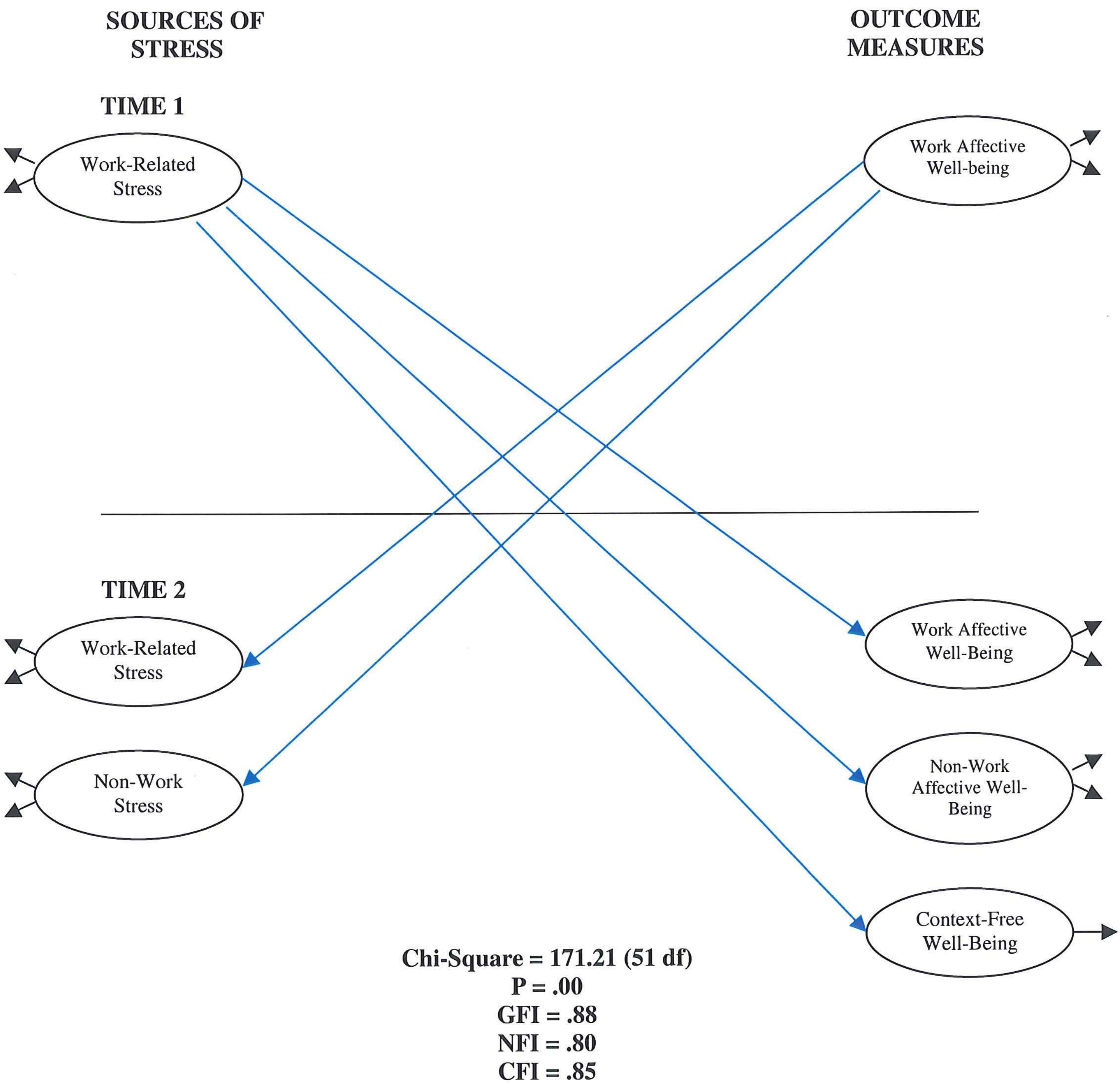
Similarly to Model C (section 12.2.3.3), Model C1 shall examine a reciprocal two-way cross-lagged model with both one-way and reverse structural paths from T1 sources of stress (work-related stress) and outcome measures (work-related affective well-being) to T2 sources of stress (work and non-work stress) and outcome measures (work/non-work affective well-being and context-free well-being). Model C1 partially reflects both Model A1 and Model B1 simultaneously.

The associations of importance within Model C1 are reflected by the five blue arrows that concern both the one-way and reverse reciprocal cross-lagged relationships between stress and affective well-being across work, non-work and context-free domains of life (see Figure 3.7). The chi-square value for Model C was significant at 171.21 (51 df). Fit indices produced unacceptable values varying from .80 to .88 suggesting that Model C1 does not fit the working/non-working students and trainee nurses data set (GFI = .88 NFI

= .80 and CFI = .85). Similarly to Model C, inspection of model modification statistics indicated that there were no theoretically justified changes to be made to Model C1.

The reduced parameter estimates within Model C1 are consistent with Model C in that again non-work stress, non-work affective well-being and context-free well-being variables at T1 are not introduced into the reciprocal model (see section 12.2.3.3 and Bryne, 2001). This also applies to the addition of a covariance estimate between the two exogenous T1 variables and the introduction of error covariances between observed variables over time phases. These additional estimates reflect conventional procedures when calculating reciprocal models longitudinally and therefore reflect Model C and C1.

Figure 3.7: Estimated Longitudinal Cross-Lagged Structural Equation Model for Research Hypothesis One: Model C1



Again, all of the negative and positive relationships amongst variables are in the expected direction. For example, all work-related stress variables have a negative relationship with work-related and non-work related mental health (i.e. lower levels of workplace stress are associated with greater levels of mental health/well-being within work and non-work contexts). Also, work-related stress is positively associated with context-free well-being (i.e. lower levels of stress within work and non-work are associated with lower levels of the signs of mental illness within a context-free domain).

Table 3.12 shows the regression weights for the 5 causal pathway estimated simultaneously for Model C1. Regression coefficients for the model range from -.24 to .95. The strongest association within the model is the causal pathway from work-related stress to context-free well-being (.95). The domain-specific reciprocal causal influences of work-related stress upon work-related affective well-being (-.89) and work-related affective well-being upon work-related stress (-.63) was the next greatest effect within Model C1. The relationships between work-related stress upon non-work affective well-being (-.52) and work-related affective well-being non-work stress (-.24) were the weaker causal paths in the model.

Table 3.12: Summary of the Standardised Regression Weights for the Longitudinal Cross-Lagged Structural Equation Model for Research Hypothesis One: Model C1

Standardised Regression Weights	Estimates
Work-Related Stress > Work-Related Affective Well-Being	-.89
Work-Related Stress > Non-Work Affective Well-Being	-.52
Work-Related Stress > Context-Free Well-Being	.95
Work-Related Affective Well-Being > Work-Related Stress	-.63
Work-Related Affective Well-Being > Non-Work Stress	-.24

Overall it can be observed that throughout this section 12.2.3 that models have varied from poor-acceptable to excellent.

12.2 3.7 Model Comparisons

Table 3.13 shows an overview of fit indice values for Models A, B and C as well as model comparisons that relate directly to H1: *Is there a reciprocal relationship between stress and well-being in the workplace, non-work and context-free domains of life.* Models A1, B1 and C1 shall be evaluated separately since the outcome measures differed in that work and non-work well-being was estimated with affective well-being measures (anxiety-contentment and depression-enthusiasm) as opposed to mental health measures (competence and aspiration). De Jonge et al (2001) incorporates the same model comparison analysis within their research as the present study.

Firstly, let us consider the comparison between Model A (a cross-lagged model with one-way structural paths from T1 sources of stress to T2 outcome measures) and Model B (a cross-lagged model with reverse structural paths from T1 outcome measures to T2 sources of stress). See Figures 3.2 and 3.3 respectively. These different nested models were compared by the chi-square difference test (Bentler & Bonett, 1980 and Joreskog & Sorborm, 1993). De Jonge et al (2001) uses this analytic tool and quotes "The difference between competitive models has itself a chi-square distribution with the number of degrees of freedom equal to the corresponding difference in the degrees of freedom of the separate models." The chi-square difference test revealed that the difference between the two models is significant (Model A vs Model B: Chi2 (1) = 17.22, $p < .001$) indicating that Model A better accounts for the working/non-working students and trainee nurses pooled data set than Model B which is reflected in Model A's smaller chi-square statistic and better goodness of fit indice values. In other words, there is statistical evidence that work and non-work stress influence work, non-work and context-free well-being.

Secondly, Table 3.13 displays the comparison between Model A (a cross-lagged model with one-way structural paths from T1 sources of stress to T2 outcome measures) and Model C (a reciprocal cross-lagged model with one-way and reverse structural paths from both T1 sources of stress and outcome measures to both T2 sources of stress and outcome measures). See Figures 3.2 and 3.4 respectively. The chi-square difference test showed that the difference between the two models is non-significant (Model A vs Model C: Chi2 (28) = 33.66, p = n.s) suggesting that Model A has no better statistical fit than Model C. Both models produced good fit indice values. However, it should be noted that because of the relationship between sample size and chi-square, it is difficult to detect differences between models when sample sizes are small.

Thirdly, now the test comparison between Model B (a cross-lagged model with reverse structural paths from T1 outcome measures to T2 sources of stress) and Model C (a reciprocal cross-lagged model with one-way and reverse structural paths from T1 sources of stress and outcome measures to T2 sources of stress outcome measures). See Figures 3.3 and 3.4 respectively. The chi-square difference test reveals that the difference between the two models is non-significant (Model B vs Model C: Chi2 (29) = 16.14, p = n.s) indicating that Model B no better fits the data than Model C.

Table 3.13: Summary of the Longitudinal Cross-Lagged Structural Equation Path Models A, B & C for Research Hypothesis One: Goodness-of-Fit Statistics & Model Comparisons

Model	Chi2	d.f.	GFI	NFI	CFI
Model A	38.71	20	.96	.88	.93
Model B	55.93	19	.94	.84	.88
Model C	72.37	48	.95	.92	.97
Model Comparisons	**Chi2Diff**		**d.f**		**P Value**
Model A & Model B	17.22		1		sig***
Model A & Model C	33.66		28		non-sig
Model B & Model C	16.14		29		non-sig

$p < .05^*$, $p < .01^{**}$, $p < .001^{***}$

Let us now examine the comparison between Model A1 (a cross-lagged model with one-way structural paths from T1 sources of stress to T2 outcome measures) and Model B1 (a cross-lagged model with reverse structural paths from T1 outcome measures to T2 sources of stress). However this time the outcome measures reflect affective well-being in both work and non-work contexts. See Figures 3.5 and 3.6 respectively and Table 3.14. The chi-square difference test revealed that the difference between the two models is significant (Model A1 vs Model B1: Chi2 (0) = 75.41, p< .001) indicating that Model A1 better fits the data than Model B1 which is reflected in Model A1's smaller chi-square value and greater goodness of fit statistics. Evidence indicates that T1 sources of stress influences T2 outcome measured (affective well-being) represented by Model A1. Furthermore, unlike Model B1, Model A1 produced good fit indice values.

Now the comparison between Model A1 (a cross-lagged model with one-way structural paths from T1 sources of stress to T2 outcome measures) and Model C1 (a reciprocal cross-lagged model with one-way and reverse structural paths from T1 sources of stress and outcome measures to T2 sources of stress and outcome measures). See Figures 3.5

and 3.7. The chi-square difference test shows that the difference between the two models is significant (Model A1 vs Model C1: Chi2 (33) = 129.37, $p < .001$) suggesting again that Model A1 better accounts for the data than Model C1. This significant difference is represented in Model A1's considerably smaller chi-square value and superior goodness of fit statistics. Thus, once again statistical evidence indicates that T1 sources of stress influence T2 outcome measures represented by Model A1.

Finally, the test comparison between Model B1 (a cross-lagged model with reverse structural paths from T1 outcome measures to T2 sources of stress) and Model C1 (a reciprocal cross-lagged model with one-way and reverse structural paths from T1 sources of stress and outcome measures to T2 sources of stress and outcome measures). See Figures 3.6 and 3.7 respectively. The chi-square difference test reveals that the difference between the two models is significant (Model B1 vs Model C1: Chi2 (33) = 53.96, $p < .01$). Generally in terms of chi-square relative to degrees of freedom and based upon the fit indice statistics, it would suggest that Model C1 shows the best fit of the two competing models. Thus, the data better fits Model C1 than Model B1. Statistical evidence therefore indicates that the T1 reciprocal cross-lagged model with one-way and reverse structural paths from sources of stress and outcome measures influence T2 sources of stress and outcome measures reflected in Model C1.

Table 3.14: Summary of the Longitudinal Cross-Lagged Structural Equation Path Models A1, B1 & C1 for Research Hypothesis One: Goodness-of-Fit Statistics & Model Comparisons

Model	Chi2	d.f.	GFI	NFI	CFI
Model A1	41.84	18	.95	.91	.95
Model B1	117.25.	18	.88	.76	.78
Model C1	171.21	51	.88	.80	.85
Model Comparisons	**Chi2Diff**		**d.f**		**P Value**
Model A1 & Model B1	75.41		0		sig***
Model A1 & Model C1	129.37		33		sig***
Model B1 & Model C1	53.96		33		sig**

$p < .05$*, $p < .01$**, $p < .001$***

Based upon the evidence from the model comparisons and considering the general overall best fit within section 12.2.3, the best fitting model chosen from all six Models to address H1 is now established. Thus, Model C showed the best fit of all competing Models (a reciprocal cross-lagged model with one-way and reverse structural paths from T1 sources of stress and outcome measures within the workplace to T2 sources of stress and outcome measures within work, non-work and context-free domains). Outcome measures for this model reflected work and non-work mental health and context-free well-being. Although there was no significant chi-square difference between Model A and Model C and between Model B and C (see Table 3.13), in terms of chi-square relative to the degrees of freedom this model showed the best fit. If one were to take the fit indices as the most important practical fit, it would also lead to the preference of Model C as this model produced the strongest fit statistics of all the six models. Theoretically, it would seem probable that Model C would produce good fit based upon the results from Models A and B as they mostly contain both the prior models causal paths simultaneously.

Based upon the same criteria, if there was a comparison between the accompanying three groups of models that represent either mental health or affective well-being outcome measures (i.e. A/A1, B/B1 and C/C1) it would appear that the two one-way models produced the best fit (accompanying Models A and A1) which reflects a cross-lagged model with one-way structural paths from T1 sources of stress to T2 outcome measures across work, non-work and context-free life domains (see Figures 3.2 and 3.5). The accompanying Models C and C1 showed the next best fit representing a reciprocal cross-lagged model with one-way and reverse structural paths from T1 sources of stress and outcome measures within the workplace to T2 sources of stress and outcome measures within work, non-work and context-free life domains (see Figures 3.4 and 3.7). Accompanying Models B and B1 produced the weakest fit between the three groups of models. These two models represent a cross-lagged model with reverse structural paths from T1 outcome measures to T2 sources of stress within work, non-work and context-free domains (see Figures 3.3 and 3.6).

Due to word count and the possible number of potential comparisons of models, it was considered that comparisons between all six models within section 12.2.3 were not viable. However, individual analysis of each model and the most interesting and relevant comparisons to the current studies H1 were reported within the above section 12.2.3.7.

12.2 3.8 H1 Final Model Estimated with Negative Affectivity

As previously mentioned, negative affectivity will now be introduced within the best fitting Model C in order to examine the influence of the variable upon the model and to determine whether it should be controlled for as a confounding third order effect before any further analysis is conducted. Thus, the aim of the following analysis is to determine whether the presence of negative affectivity has an effect upon the relationship and fit of the sources of stress and outcome measures variables present within Model C. The final best fitting model (with or without negative affectivity) will then be put forward for multi-group analysis within the following section.

With the introduction of the variable negative affectivity and unlike Model C within section 12.2.3.3, non-work stress and non-work mental health variables at T2 were not introduced into the model as too many parameters within the model related with the associated degrees of freedom would produce identification problems in that the unique set of parameters would not be consistent with the data (Bryne, 2001). Nevertheless, it was considered important to proceed with the current analysis.

The associations of interest are represented by this time six blue arrows which attempt to address the reciprocal cross-lagged model with both one-way and reverse structural paths from T1 sources of stress (work-related stress) and outcome measures (work-related mental health) to T2 sources of stress and outcome measures simultaneously as well the influence of negative affectivity as a confounding variable (see Figure 3.8). The chi-square statistic for the H1 Final Model with negative affectivity was significant at 267.91 (29 df). However, chi-square has limitations in that good-fitting models can be rejected on the basis of trivial misspecifications in large samples as mentioned earlier. Alternatively, goodness of fit indice statistics were investigated but also produced poor fit indicating that H1 Final Model with Negative Affectivity (reflected in Model C) fails to fit the working/non-working students and trainee nurses data set (GFI = .83 NFI = .63 and CFI = .65). Statistical evidence therefore suggests that Model C without the additional effects of negative affectivity better fits the data than Model C with the influence of negative affectivity.

Figure 3.8: Estimated Longitudinal Cross-Lagged Structural Equation Model for Research Hypothesis One: H1 Final Model Estimated with Negative Affectivity

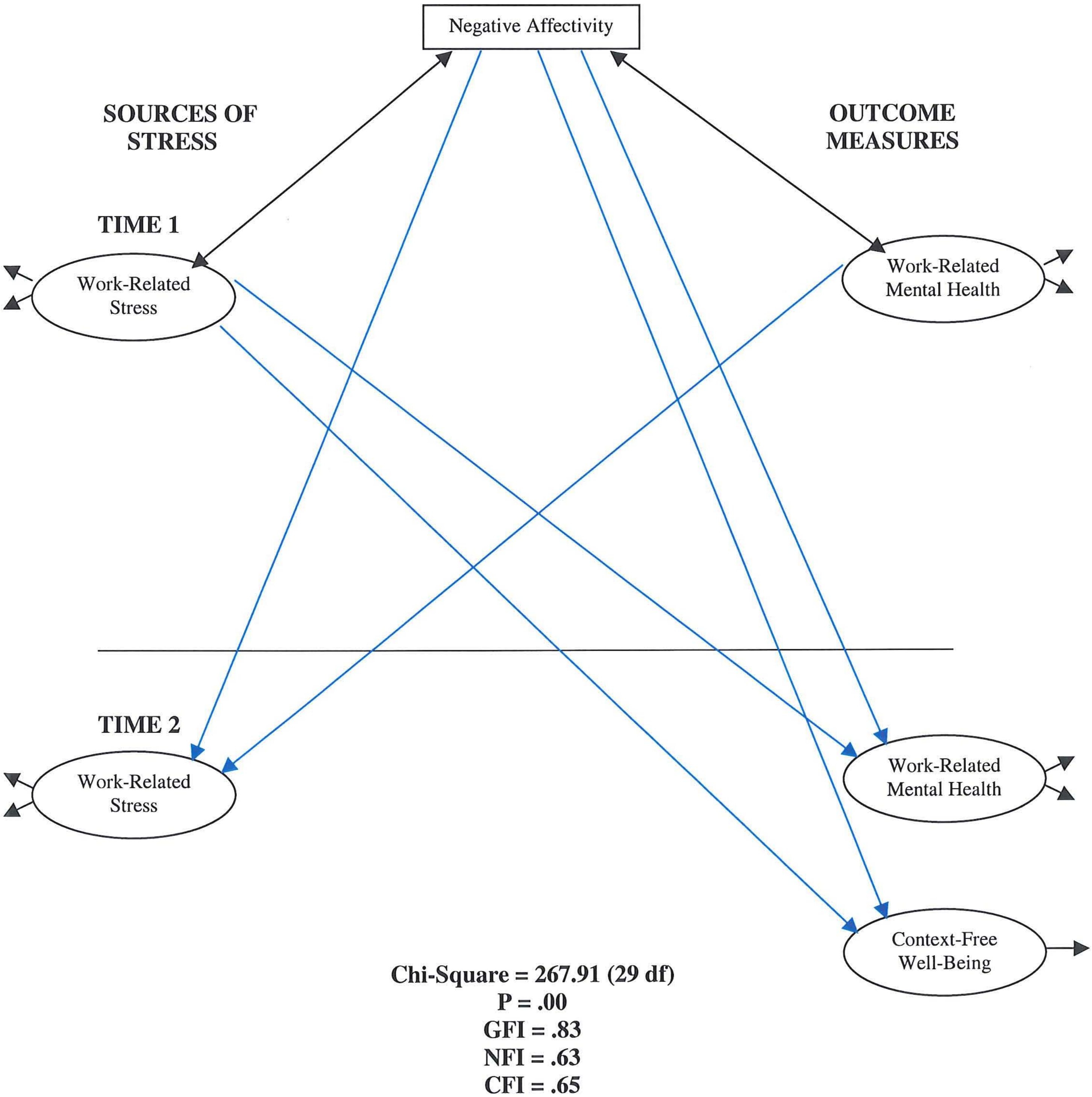


Table 3.15 shows the regression weights for the six causal pathway estimated simultaneously for Model C with the inclusion of negative affectivity acting as a third variable influence between the stress and well-being variables within the model. All associations are in the anticipated direction). Regression weights for the whole model range from .18 to .89.

Similarly to Model C, the strongest association within the model is the causal pathway from work-related stress to context-free well-being (.89). Table 3.15 shows that this causal path again has the strongest effect upon reciprocal Model C with negative affectivity (i.e. greater levels of workplace stress are related to greater levels of minor symptoms of general well-being). However, the effects of negative affectivity upon both work-related mental health and work-related stress (-.47 and .18 respectively) were greater than the effects of both work-related stress and work-related mental health upon the same variables (-.34 and -.19) thus indicating that although the model produced poor fit, the effects of for example negative affectivity (neuroticism) upon stress and well-being within this model is quite strong (i.e. high levels of negative affectivity are related to high levels of stress and low levels of well-being). Also the effect of negative affectivity upon context-free well-being was strong (.46). Nevertheless, overall all the causal effects of the exogenous variables upon the endogenous variables within Model C (section 12.2.3.3) are greater than the current model with negative affectivity.

Table 3.15: Summary of the Standardised Regression Weights for the Longitudinal Cross-Lagged Structural Equation Model for Research Hypothesis One: H1 Final Model Estimated with Negative Affectivity

Standardised Regression Weights	Estimates
Work-Related Stress > Work-Related Mental Health	-.34
Work-Related Stress > Context-Free Well-Being	.89
Work-Related Mental Health > Work-Related Stress	-.19
Negative Affectivity > Work-Related Mental Health	-.47
Negative Affectivity > Context-Free Well-Being	.46
Negative Affectivity > Work-Related Stress	.18

Further examination of the results for this section (12.2.3) shall be discussed within SECTION D: DISCUSSION

12.2.4 Multi-Group Invariance Analysis of the Final Longitudinal Cross-Lagged Structural Equation Path Model: Research Hypothesis One

Chapter Five (section 5.5.3) briefly outlines the rationale for incorporating multi-group analysis on different data sets. Basically, concerned researchers have noted the importance of cross-validation as a means of testing SEM more stringently (Anderson & Gerbing, 1988, see Bryne).

Thus, the following section will explore the invariance of the final best fitting longitudinal cross-lagged SEM causal structure investigated throughout section 12.2 to address H1 (Model C without negative affectivity) using data from both the working/non-working students and trainee nurses pooled data as well as the university staff sample simultaneously. The aim of the analysis is to determine whether particular estimated causal paths between the stress and well-being constructs (x5) are equal across both samples of data when constrained thus indicating invariance for Model C. Again, Model C will examine a reciprocal cross-lagged model with both one-way and reverse structural paths from T1 sources of stress (work-related stress) and outcome measures (work-related mental health) to T2 the same sources of stress (work, non-work stress) and outcome measures (work, non-work and context-free mental health).

12.2 4.1 H1 Final Model

The first stage within multi-group analysis that estimates the causal pathways between variables in a model is to establish a multi-group baseline model without constraints against which to compare subsequent models where equality constraints are imposed. Model C from section 12.2.3 was therefore estimated to be used as a baseline point in determining the extent to which the causal paths are the same across both groups of data. The baseline model exhibited a chi-square value of 186.62 (100 df) with acceptable to good multi-group fit indice values (GFI = .92, NFI = .86 and CFI = .93).

All eight causal paths relating to H1 were constrained to be equal across groups and then estimated during stage two (referred to as Model Ca). The chi-square statistic is of primary interest as it shall be compared against the unconstrained baseline model, and produced a value of 191.28 (105 df). The difference in the chi-square statistic between this constrained model and the unconstrained baseline model is 4.66, with 5 df, which is not statistically significant at the .05 probability level (see Table 3.16). Based on these results, the causal structure reflected in Model Ca is equivalent/invariant across the working/non-working students and trainee nurses pooled data and the university staff sample of data indicating cross-validation between groups. Similarly to Model C, acceptable to good fit statistics were again produced for Model Ca (GFI = .92, NFI = .85 and CFI = .93).

Provided with this information, we now know that all equality constraints exhibited by the five causal structure arrows in Model C hold consistent across the two groups (see Table 3.16).

Table 3.16: Multi-group Invariance Analysis of the Final Longitudinal Cross-Lagged Structural Equation Path Model for Research Hypothesis One: Goodness-of-Fit Statistics & Model Comparisons

	Chi2	d.f.	GFI	NFI	CFI
Model C	186.62	100	.92	.86	.93
Model Ca	191.28	105	.92	.85	.93
Model Comparisons	**Chi2Diff**		**d.f**		**P Value**
Model C & Model Ca	4.66		5		non-sig

$p < .05*$

Table 3.16 shows the completed final model representing H1 with complete measurement invariance for the five cross-lagged reciprocal causal pathways (Model Ca). Overall, results from the multi-group invariance analysis of the final longitudinal cross-lagged SEM Path Model for H1 testing the stability of the causal structure across samples revealed that Model C with five causal path constraints is invariant and good-fitting.

12.2.5 Summary of the Structural Equation Modeling Analysis for Research Hypothesis One

Section 12.2 within Chapter Twelve presented the structural equation modeling (SEM) analysis to address H1 within the current research. The hypothesis states that:

There is a reciprocal relationship between stress and well-being in the workplace, non-work and context-free domains of life.

Both stress influences well-being as well as well-being influences stress. The reciprocal relationship between the two variables will be consistent across the three domains of life as depicted in Figure 1.9, Figure 1.10 and Figure 3.1.

Initially section 12.2.1 outlined the hypothesised theoretical SEM model associated with H1. Following this, a series of confirmatory factor analysis of all the scales measurement models was incorporated within this section of analysis. Fit indice statistics for each particular scale generally varied from acceptable to excellent. However, the majority of measures produced excellent fit. Six longitudinal SEM causal path models were then investigated. Models A, C and A1 produced excellent fit, Models B produced acceptable to good fit and Models B1 and C1 exhibited poor fit (see section 12.2.3 for Model descriptions). Model comparisons discovered that Model C (a reciprocal cross-lagged model with both one-way and reverse structural paths from T1 sources of stress (work-related stress) and outcome measures (work-related mental health) to T2 sources of stress (work and non-work related stress) and outcome measures (work, non-work and context-free well-being) was the best fitting model. Further analysis found that final Model C reflecting H1 best fitted the data without the additional effects of negative affectivity. Finally, multi-group analysis with the addition of the university staff sample indicated that all the causal paths within Model C were invariant across both groups.

The analysis performed throughout this section partially supports H1 in that the measurement models, longitudinal cross-lagged SEM path models, comparison of models and multi-group analysis that are all related to Model C support the hypothesis. However, Model C did not incorporate non-work stress, non-work well-being and context-free well-being endogenous variables at T1 within the model due to identification problems.

12.3 Structural Equation Modeling Analysis: Research Hypothesis Two – Stress, Well-Being & Control

Further structural equation modeling (SEM) analysis will be conducted as initially described within Chapter Ten (Analytic Procedure). Similarly to section 12.2 (SEM analysis reflecting H1), this section which addresses hypothesis three (H2) consists of five major parts: hypothesised theoretical SEM for research hypothesis two (12.3.1), confirmatory factor analysis (CFA, 12.3.2), longitudinal cross-lagged SEM path analysis (12.3.3), multi-group analysis of the final longitudinal cross-lagged SEM (12.3.4) and a summary of the all the SEM for hypothesis three (12.3.5).

12.3.1 Hypothesised Theoretical Structural Equation Model for Research Hypothesis Three

Figure 3.9 and 3.9a show the SEM hypothesised model for H3:

H3: There is a reciprocal relationship between stress, control and well-being in the workplace, non-work and context-free domains of life.

Similarly to the theoretical models outlined in H1, circles represent latent variables and arrows directed away from the latent variables reflect the number of observed factors associated to that particular latent variable for the sources of stress, process variables (control) and outcome measures across two time phases. For example, work-related stress has two arrows representing workload and interpersonal conflict and work-related control has one arrow reflecting level of control within the workplace. Cross-lagged arrows directed away from latent variables at time one (T1) to latent variables at time two

(T2) represent both causal paths between stress and control across work and non-work domains (Figure 3.9) and causal paths between well-being and control across work, non-work and context-free domains (Figure 3.9a). All arrows estimated simultaneously reflect a reciprocal model.

The principles mentioned above refer to both Figure 3.9 and the accompanying Figure 3.9a. The models vary in that the sources of stress variables reflected in Figure 3.9 (work and non-work stress) are replaced by the outcome measures variables shown in Figure 3.9a (work, non-work and context-free well-being). Both the stress and well-being variables are estimated along-side the process variables (work and non-work control).

Figure 3.9: Hypothesised Theoretical Structural Equation Model for Research Hypothesis Two

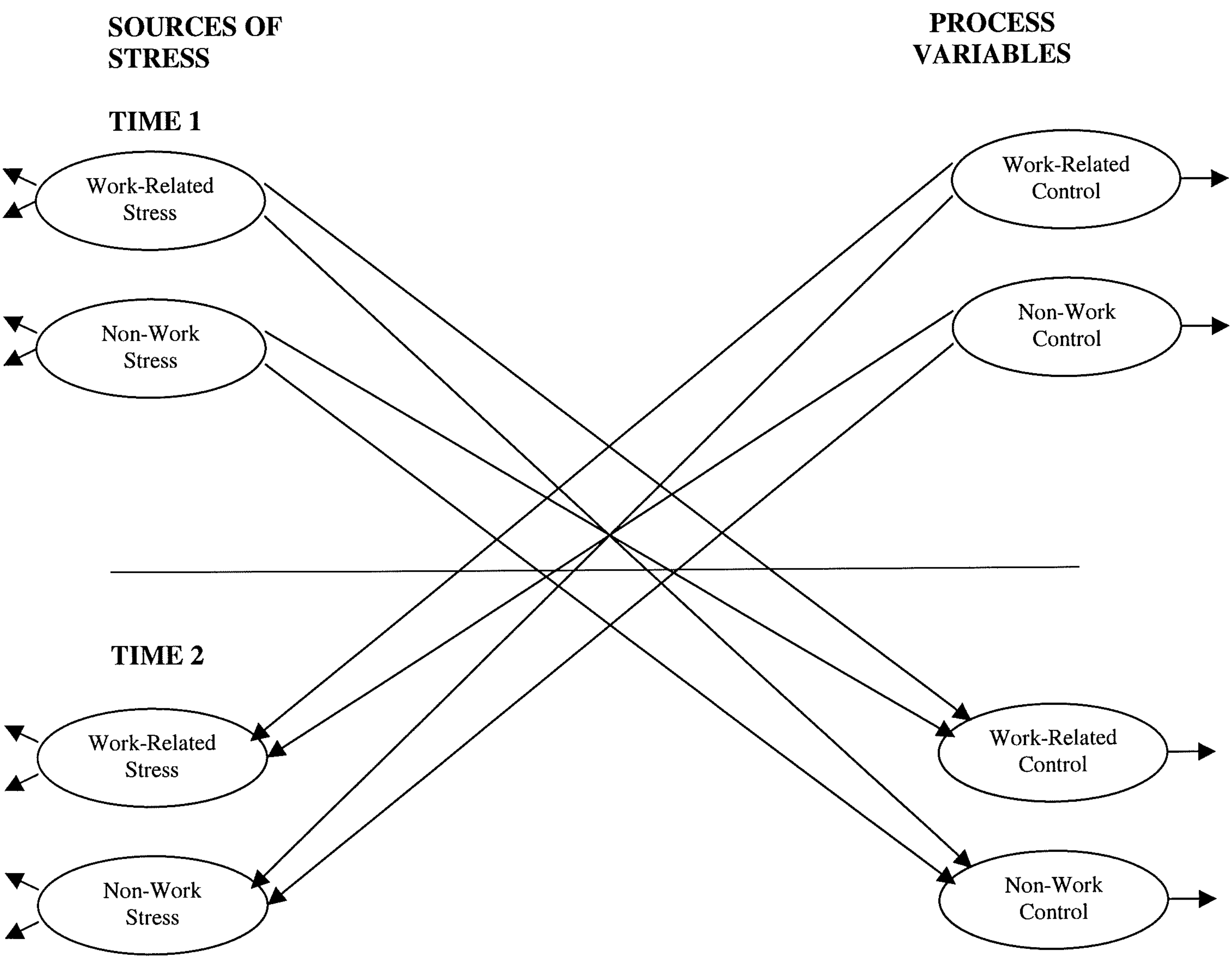
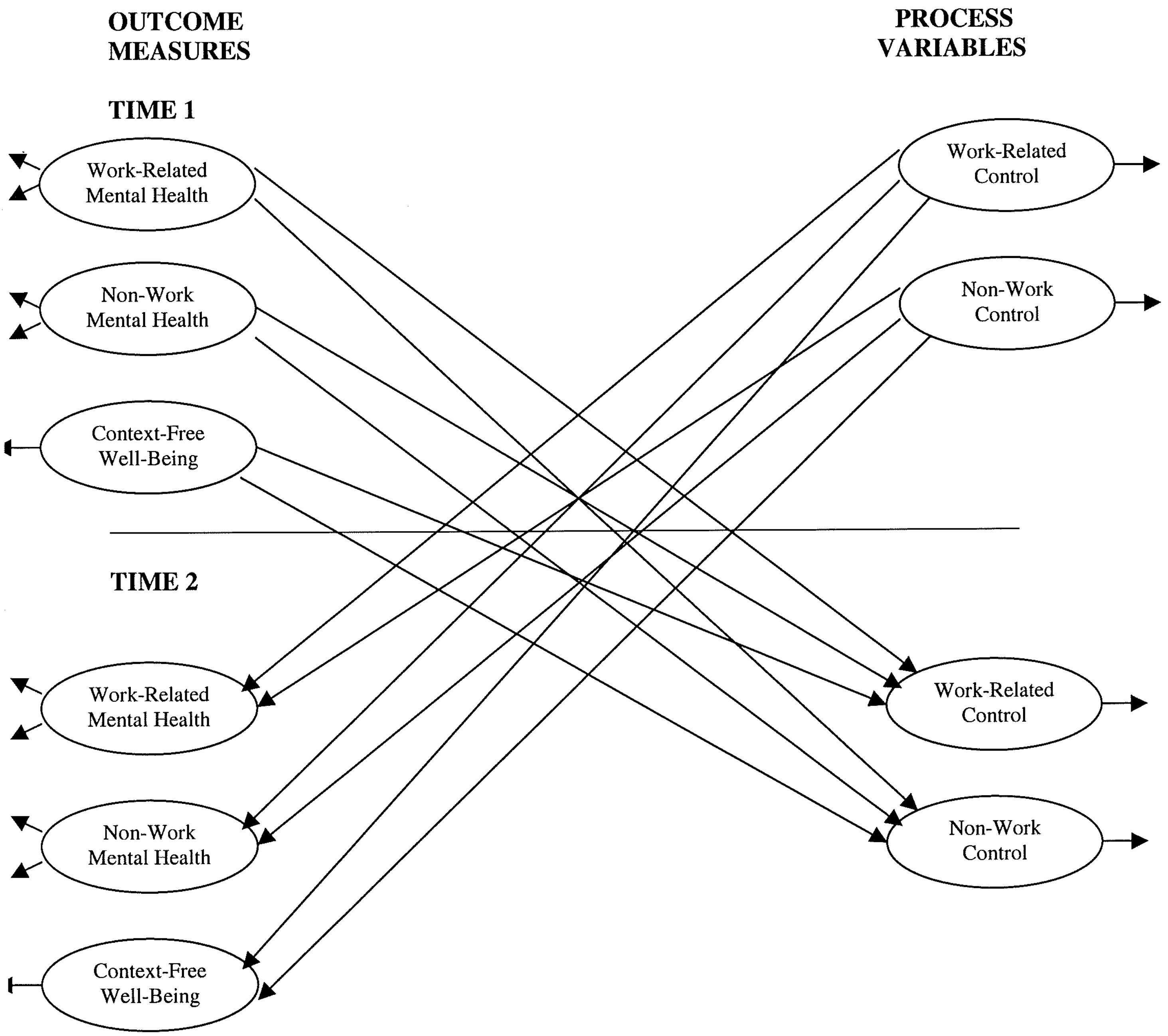


Figure 3.9a: Hypothesised Theoretical Structural Equation Model for Research Hypothesis Two



12.3.2 Confirmatory Factor Analysis of the Measurement Models

This following section will outline issues concerned with the estimation of the two CFA measurement models related to H2. Issues concerning assumptions, identification, procedure etc within CFA estimation was discussed at length earlier within Chapter Twelve (section 12.2.2) and also refers to the current analysis. Additionally, CFA regarding the current study should also be read in conjunction with Chapter Eight, which discusses at length the content of the scale measures incorporated within the analysis.

Scale measurements used in relation to H2 analysed from the pooled working/non-working students and trainee nurse's sample consisted of a large sample size of 1061.

As with all previous CFA, all cases/participants shall be deleted from the analysis where there is missing data.

12.3.2.1 Work-Related Control

First-order CFA was conducted to test the measurement model of the mastery at work scale (Pearlin Schooler, 1978) consisting of three observed items (item three is reversed). See Chapter Eight (section 8.6.1.5) for a discussion on the scales item and content. The first order latent variable represents work-related control. Error variables have been constrained to identify the model and account for any influences on the respective variable referred to as error of measurement (see Bryne, 2001). Regression weights have also been constrained as standard procedure. See Appendix 3.10 for an AMOS graphical representation of the outcome of the analysis (observed variables workconl, workcon2 and workco3r represent items 1-3 in the questionnaire with r reflecting a reversed item).

The chi-square test was statistically non-significant with a value of 2.74 (df = 1) which produced a ratio below three involving dividing the chi-square statistics by the degrees of freedom. This indicates good fit. The three goodness of fit statistics also provided an excellent fit to the data for this small 3-item scale (GFI = .99, NFI = .99, and CFI = .99), thus indicating that this workplace control measurement model incorporated within the current analysis strongly fits the data from the working/non-working students & trainee nurses sample. Standardised regression weights for the three items are .76, .82 and .24 respectively. No modifications to the model were necessary.

12.3.2.2 Non-Work Control

Similarly, a first-order CFA was performed this time to examine the measurement model of control in non-working life. The scale again derives from Pearlin & Schooler (1978). See Chapter Eight (section 8.6.2.4). See Appendix 3.11 for an AMOS graphical representation of the outcome of the analysis (observed variables nonwconl-nonwcon3 represent items 1-3 in the questionnaire).

The chi-square test was statistically significant with a value of 7.6 (df = 1). The three goodness of fit statistics provided an excellent fit to the data (GFI = .99, NFI = .99, and CFI = .99) thus indicating that the non-work control measurement model incorporated within the current analysis strongly fits the data from the working/non-working students

& trainee nurses sample. The three regression weights reflecting the first order latent variable are .76, .82 and .68 respectively. Again, no modifications to the model were necessary.

Table 3.17 represents the results of the CFA measurement models for both the additional scales used within the current analysis for H2 (work-related control and non-work control). For a summary of the other outstanding measurement models used within H2, refer to section 12.2.2 (Table 3.6).

Table 3.17: Summary of all the Confirmatory Factor Analysis Measurement Models for Hypothesis Three: Chi-Square & Goodness of Fit Statistics

Measurement Model	Chi2	d.f.	GFI	NFI	CFI
Work-Related Control	2.74	1	.99	.99	.99
Non-Work Control	7.6	1	.99	.99	.99

12.3.3 Longitudinal Cross-Lagged Structural Equation Path Model Analysis

The hypothesised SEM in Figure 3.9 and Figure 3.9a representing H3 will now be estimated to investigate whether the model fits the pooled working/non-working students and trainee nurses data. As with all longitudinal SEM causal models throughout Chapter Twelve, section 12.3.3 also estimates models with sample sizes of 179.

Again, it should be observed that both models within the current section will be calculated by examining causal pathways between first order latent factors (work-related control, non-work control and context-free well-being) and second-order latent factors (work-related stress and mental health and non-work stress and mental health). Covariances will be imposed between error residuals that are associated to observed variables that are the same across life domains and over time periods as within the former analysis conducted within previous sections in the present study. For example, covarances will be estimated between work-related stress and non-work stress and between work-related stress T1 and work-related stress T2 etc (see Maruyama, 1998). See section 12.2.3 for further references supporting this technique. As with all analysis within the current related sections, residual error terms are associated with the four endogenous second-order latent variables at T2 for both Model C (Figure 3.9) and Model C1 (Figure 3.9a). Also again, covariances are conventionally imposed between the T1 stress latent variables and T1 control latent variables (Figure 3.9) and between T1 outcome measures latent variables and T1 control latent variables (Figure 3.9a). These covariances are imposed within work and non-work contexts for both sets of variables.

Again, competing models will be estimated alongside one another in order to address H2 as was performed in relation to H1. However, since complete models for both Models C and C1 in regards to H2 contain less parameters to be estimated (in that the control variables only contain one observed and associated latent variable), longitudinal reciprocal models that consider all variables across time and domain for each model can be analysed. Issues in relation to identification were mentioned in earlier section within Chapter Twelve. Thus, unlike previous analysis, the following models do not contain too many variables/parameters associated with the degrees of freedom that could introduce identification problems (Bryne, 2001). Therefore, rather than conducted a series of six competing models reflecting one-way, reverse and reciprocal associations between two individual constructs (i.e. x3 models in relation to stress and control and x3 models in relation to well-being and control respectively as within previous section for H1; 12.2.3), two full models examining the three causal pathways within one single model shall be performed. These two competing models shall be estimated in order to address H2:

> Model C: a simultaneously estimated reciprocal cross-lagged model with one-way and reverse structural paths from time one (T1) sources of stress and control measures to time two (T2) sources of stress and control measures. The stress and control measures at both time phases represent both work and non-work life domains.

> Model C1: a simultaneously estimated reciprocal cross-lagged model with one-way and reverse structural paths from time one (T1) outcome measures and control measures to time two (T2) outcome measures and control measures. The outcome and control measures at both time phases represent work, non-work and context-free life domains where appropriate.

An examination of model comparisons for H2 will then be discussed.

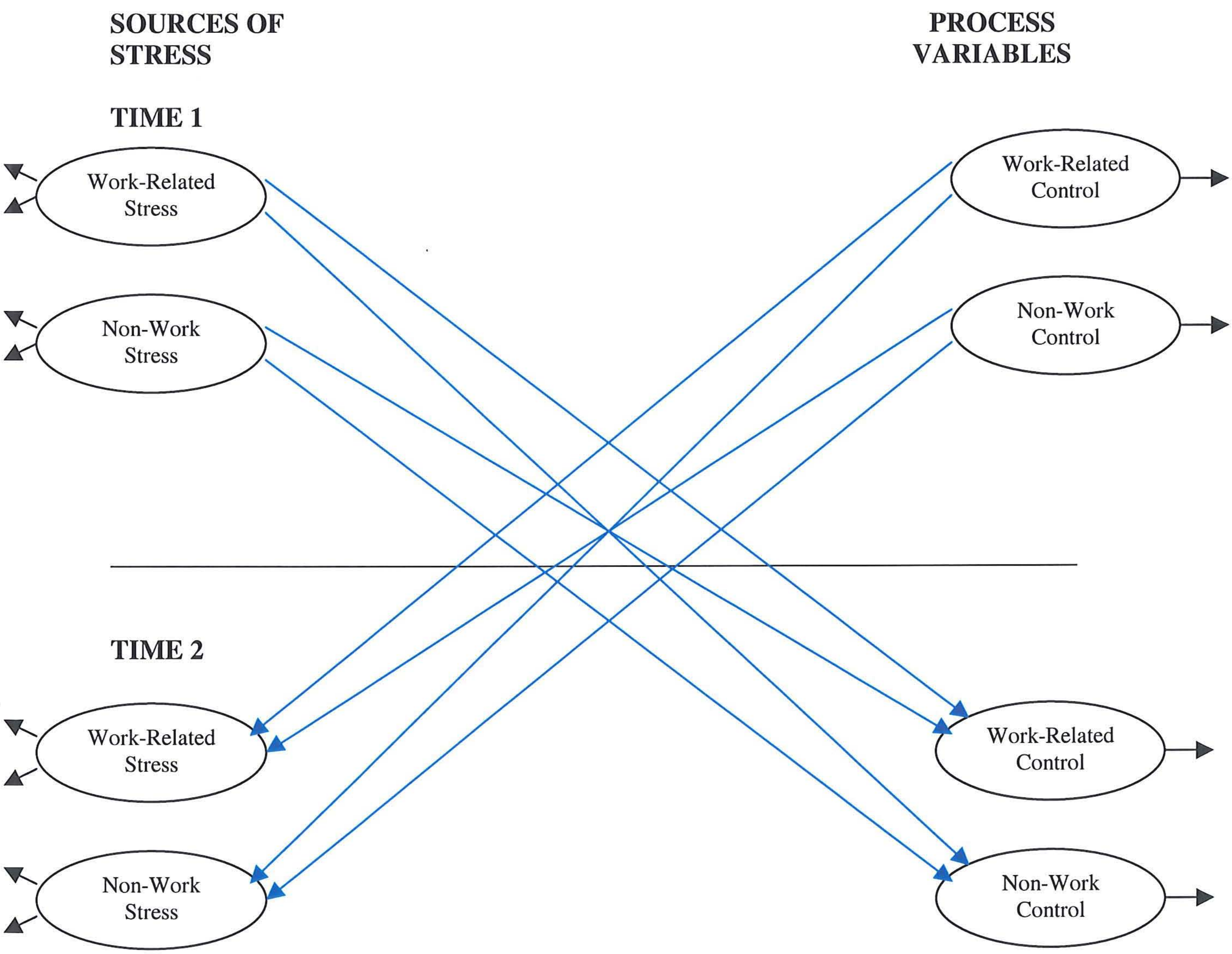
The rationale for naming the two models above as Models C and Model C1 has been in an attempt to remain consistent with other similar reciprocal models within earlier sections that were also referred to as Models C (i.e. 12.2.3).

12.3.3.1 Model C

Model C will examine a reciprocal cross-lagged model with both one-way and reverse structural paths from T1 sources of stress (work-related and non-work stress) and control measures (work-related and non-work control) to T2 the same sources of stress and control measures.

The relationships of interest within the following analysis for Model C are represented by the eight blue arrows which address both the one-way and reverse reciprocal cross-lagged associations between stress and control across work and non-work at T1 and across work and non-work at T2 (see Figure 3.10). The chi-square statistic for Model C was significant at 64.40 (40 df). Goodness of fit statistics produced overall good fit indicating that Model C does fit the working/non-working students and trainee nurses data set (GFI = .95 NFI = .89 and CFI = .95). Inspection of the model modification suggested that there were no theoretically justified amendments to be made to Model C.

Figure 3.10: Estimated Longitudinal Cross-Lagged Structural Equation Model for Research Hypothesis Two: Model C



Chi-Square = 64.40 (40 df)
P = .00
GFI = .95
NFI = .89
CFI = .95

All of the negative associations between variables are in the expected direction. For example, all work-related and non-work related stress variables have a negative relationship with work-related and non-work related control (i.e. lower levels of stress within the work non-work contexts are associated with greater levels of control within work and non-work contexts). However, the positive relationship between work-related control and non-work stress was not anticipated.

Table 3.18 shows the standardised regression weights for the eight causal pathways estimated simultaneously for Model C. Regression weights for the model range from -.05 to -.82. By far the two strongest associations within the model are the domain specific one-way causal pathways from work-related stress to work-related control (-.80) and from non-work stress to non-work control (-.82). These regression coefficients suggest that low levels of stress influence high levels of control in respondents within both work and non-work contexts. Table 3.18 reveals that these causal paths have the strongest effect upon reciprocal Model C. Thereafter, the reverse domain-specific causal influences of work-related control upon work-related stress (-.26) and non-work control upon non-work stress (-.21) had overall the next greatest effect. These two causal paths indicate that greater levels of control experienced influence low levels of stress again within both work and non-work life domains. Also, the two non-domain specific relationships within Model C produced the next strongest standardised regression coefficients i.e. the one-way effects of non-work stress upon work-related control and the reverse effects of non-work control upon work-related stress (-.22 and -.24 respectively). Thus, indicting that out of work stress and control have a greater influence on workplace stress and control than does work-related stress and control upon non-work stress and control.

Table 3.18: Summary of the Standardised Regression Weights for the Longitudinal Cross-Lagged Structural Equation Model for Research Hypothesis Two: Model C

Standardised Regression Weights	Estimates
Work-Related Stress > Work-Related Control	-.80
Work-Related Stress > Non-Work Control	-.05
Non-Work Stress > Work-Related Control	-.22
Non-Work Stress > Non-Work Control	-.82
Work-Related Control > Work-Related Stress	-.26
Work-Related Control > Non-Work Stress	.10
Non-Work Control > Work-Related Stress	-.24
Non-Work Control > Non-Work Stress	-.21

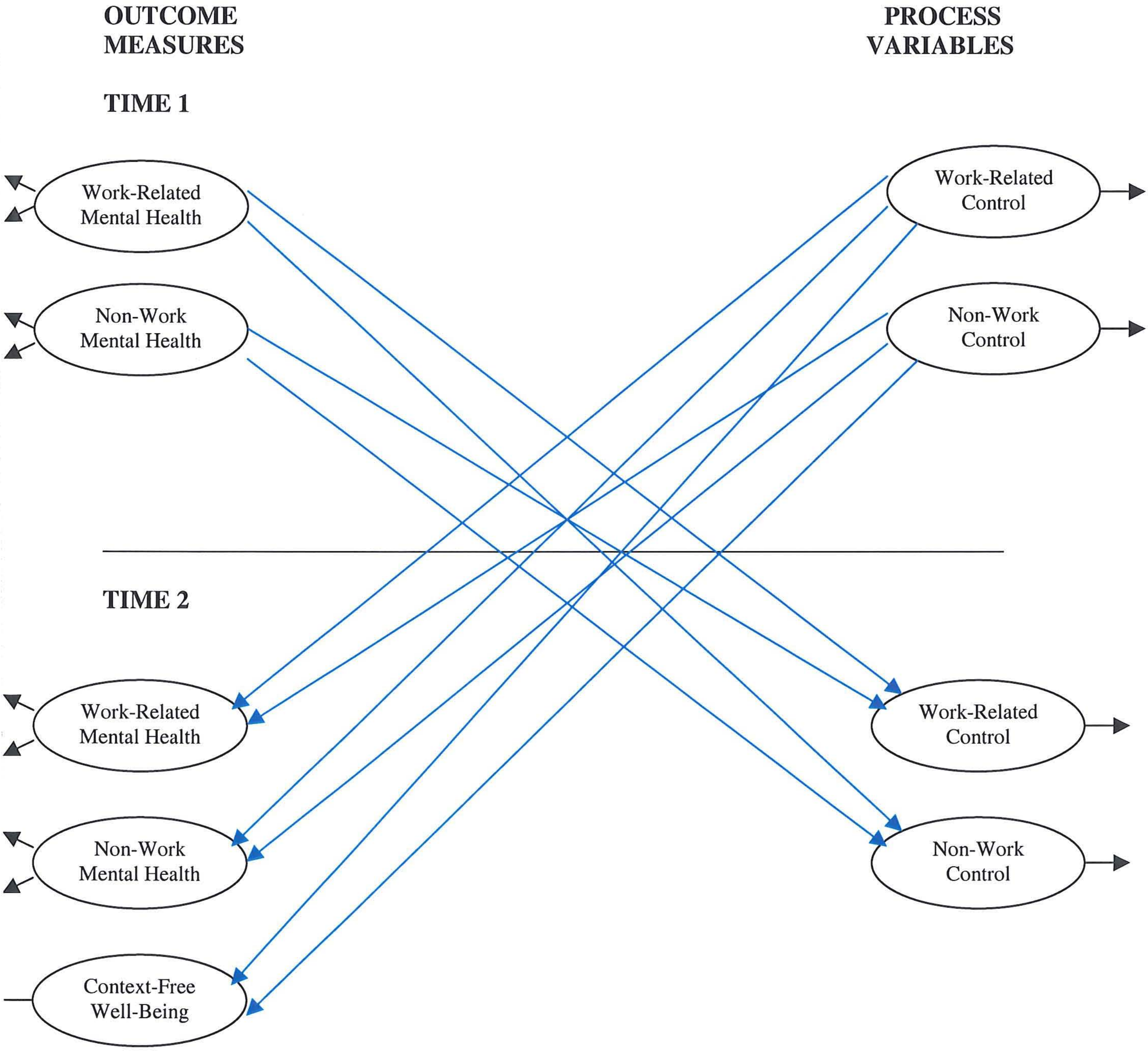
12.3 3.2 Model C1

Similarly to the above Model C (section 12.3.3.2), Model C1 shall investigate a reciprocal two-way cross-lagged model with both one-way and reverse structural paths from T1 outcome measures (work and non-work mental health) and process/mediating measures (work and non-work control) to T2 outcome measures (work, non-work and context-free mental health) and control measures (work and non- work control). Context-free well-being at T1 was not included due to identification problems.

The relationships of importance within Model C1 are reflected by the ten blue arrows that concern both the one-way and reverse reciprocal cross-lagged causal pathways between mental health and perceived control across work, non-work and context-free domains of life (see Figure 3.11). The chi-square value for Model C1 was significant at 150.02 (46 df). Fit indices produced unacceptable to approaching fit values suggesting that Model C1 does not fit the working/non-working students and trainee nurses data set adequately

(GFI = .89 NFI = .86 and CFI = .89). Inspection of model modification statistics indicated that there were no theoretically justified changes to be made to Model C1.

Figure 3.11: Estimated Longitudinal Cross-Lagged Structural Equation Model for Research Hypothesis Two: Model C1



Chi-Square = 150.02 (46 df)
P = .00
GFI = .89
NFI = .86
CFI = .89

All of the positive and negative associations between variables are in the expected direction. For example, all work-related and non-work related well-being variables have a positive relationship with work-related and non-work related control (i.e. greater levels of well-being within the work non-work contexts are associated with greater levels of control within work and non-work contexts). Also, the two negative relationships between work/non-work control and context-free well-being are also in the expected causal direction in that high levels of control in work and non-work are related to low levels of mental health problems.

Table 3.19 displays the standardised regression weights for the ten causal pathways estimated simultaneously for Model C1. Coefficients for the model range from .09 to -.93. The strongest association within the model is the reverse causal pathway from non-work control to context-free well-being (-.93). This finding reveals that perceived outside of work control influences context-free well-being. The domain-specific reciprocal two-way causal influences of work-related mental health upon work-related control (.77) and work-related control upon work-related mental health (.59) was the next greatest effect within Model C1. Similarly, this is followed by again the domain-specific reciprocal two-way causal influences of non-work mental health upon non-work control (.58) and non-work control upon non-work mental health (.55). Since Model C1 overall did not produce an acceptable fit to the data, other non-domain specific associations between particular variables did not produce strong regression weights (see Table 3.19). However, the other outstanding association in regards to the context-free well-being variable did produce a reasonably strong regression coefficient. This was the effect of workplace control upon context-free well-being (-.37)

Table 3.19: Summary of the Standardised Regression Weights for the Longitudinal Cross-Lagged Structural Equation Model for Research Hypothesis Two: Model C1

Standardised Regression Weights	Estimates
Work-Related Mental Health > Work-Related Control	.77
Work-Related Mental Health > Non-Work Control	.09
Non-Work Mental Health > Work-Related Control	.17
Non-Work Mental Health > Non-Work Control	.58
Work-Related Control > Work-Related Mental Health	.59
Work-Related Control > Non-Work Mental Health	.16
Work-Related Control > Context-Free Well-Being	-.37
Non-Work Control > Work-Related Mental Health	.20
Non-Work Control > Non-Work Mental Health	.55
Non-Work Control > Context-Free Well-Being	-.93

12.3 3.3 Model Comparisons

Table 3.20 shows a summary of the fit indice statistics for both Model C and C1 alongside model comparisons that relate directly to H2: *There is a reciprocal relationship between stress, control and well-being in the workplace, non-work and context-free domains of life.*

To refresh, Model C represents a reciprocal cross-lagged model with both one-way and reverse structural paths from T1 sources of stress (work-related and non-work stress) and control measures (work-related and non-work control) to T2 the same sources of stress and control measures. Model C1 represents a reciprocal two-way cross-lagged model with both one-way and reverse structural paths from T1 outcome measures (work and non-work mental health) and process measures (work and non-work control) to T2 the same outcome and control measures. See Figures 3.10 and 3.11 respectively. These two nested models were compared by the chi-square difference test (Bentler & Bonett, 1980 and Joreskog & Sorborm, 1993). The chi-square difference test revealed that the difference between the two models is significant (Model C vs Model C1: Chi2 (6) = 85.62, $p < .001$) indicating that Model C better accounts for the working/non-working students and trainee nurses pooled data set than Model C1 which is reflected in Model C's smaller chi-square statistic and better goodness of fit indice values. In other words, there is statistical evidence that a causal two-way reciprocal cross-lagged model between work and non-work stress and work and non-work control mutually influence one another represented by Model C.

Table 3.20: Summary of the Longitudinal Cross-Lagged Structural Equation Path Models C & C1 for Research Hypothesis Two: Goodness-of-Fit Statistics & Model Comparisons

Model	Chi2	d.f.	GFI	NFI	CFI
Model C	64.40	40	.95	.89	.95
Model C1	150.02	46	.89	.86	.89
Model Comparisons	**Chi2Diff**		**d.f**	**P Value**	
Model C & Model C1	85.62		6	sig***	

p < .001***

Based upon the evidence from the model comparisons and considering the overall best fit within section 12.3.3, the best fitting Model to address H2 is Model C.

Further investigation of the findings from this section (12.3.3) will be discussed within SECTION D: DISCUSSION.

12.3.4 Multi-Group Invariance Analysis of the Final Longitudinal Cross-Lagged Structural Equation Path Model: Research Hypothesis Two

Chapter Five (section 5.5.3) briefly summarises the rationale for using multi-group analysis on different data sets. Basically, authors have put forward the importance of cross-validation as a means of examining SEM more rigorously (Anderson & Gerbing, 1988).

The same as within section 12.2.4 in relation to H1, the following section will investigate the invariance of the final best fitting longitudinal cross-lagged SEM causal pathways tested throughout section 12.3.3 to address H3 (Model C) incorporating data from both the working/non-working students and trainee nurses pooled data as well as the university staff sample simultaneously. The purpose of the analysis is to define whether particular estimated causal paths between the stress and control constructs (x8) are equal across both data sets when constrained thus indicating invariance for Model C. Model C shall investigate a reciprocal cross-lagged model with both one-way and reverse structural paths from T1 sources of stress (work and non-work stress) and process measures (work and non-work control) to T2 the same sources of stress (work and non-work stress) and process measures (work and non-work control). See section 12.3.3 for full outline of Model C's characteristics.

12.3.4.1 H2 Final Model

As with the analysis conducted within section 12.2.4 in relation to H1, the first stage within multi-group analysis that estimates the causal structure between variables in a model is to establish a multi-group baseline model without constraints against which to compare subsequent models where equality constraints are imposed. Model C representing H3 was therefore estimated to be used as a baseline point in determining the extent to which the causal paths are the same across both groups of data. The baseline model exhibited a chi-square value of 228.33 (82 df) with poor to approaching acceptable multi-group fit indice values (GFI = .89, TLI = .78 and CFI = .83).

The eight causal paths relating to H3 were then constrained to be equal across both groups of data (referred to as Model Ca). The chi-square statistic is of most interest, as it will be compared against the unconstrained baseline model. The chi-square statistic produced a value of 234.48 (90 df). Table 3.21 shows the difference in the chi-square statistic between this constrained model and the unconstrained baseline model which is 6.15, with 8 df. This difference is not statistically significant at the .05 probability level. These findings indicate that the causal structure shown in Model Ca is equivalent/invariant across the working/non-working students and trainee nurses pooled data and the university staff sample of data showing cross-validation between groups. However, again poor to unacceptable fit statistics were exhibited for Model Ca (GFI = .89, TLI = .77 and CFI = .84).

The multi-group analysis performed shows that all equality constraints exhibited by the eight causal structure arrows in Model Ca hold consistent across the two groups (see Figure 3.10).

Table 3.21: Multigroup Invariance Analysis of the Final Longitudinal Cross-Lagged Structural Equation Path Model for Research Hypothesis Two: Goodness-of-Fit Statistics & Model Comparisons

	Chi2	d.f.	GFI	NFI	CFI
Model C	228.33	82	.89	.78	.83
Model Ca	234.48	90	.89	.77	.84
Model Comparisons	**Chi2Diff**		**d.f**		**P Value**
Model C & Model Ca	6.15		8		non-sig

p < .05*

Table 3.21 shows the final model representing H2 with complete measurement invariance for the eight cross-lagged reciprocal causal pathways (Model Ca). Findings from the multi-group invariance analysis of the final longitudinal cross-lagged SEM path model for H2 investigating the stability of the causal structure across two groups shows that Model C with eight causal path constraints is invariant. However, overall, the model is not good fitting.

12.3.5 Summary of the Structural Equation Modeling Analysis for Research Hypothesis Two

Section 12.3 presented the structural equation modeling (SEM) analysis to address H2 within the present research. The hypothesis states that:

There is a reciprocal relationship between stress, control and well-being in the workplace, non-work and context-free domains of life.

Stress influences control as well as control influences stress. Control influences well-being as well as well-being influences control. The reciprocal relationship amongst the *three variables will be consistent across the three domains of life as depicted in Figure 1.10.*

Firstly, section 12.3.1 put forward the hypothesised theoretical SEM model related with H2. Confirmatory factor analysis was then conducted on the work and non-work control scales. Goodness-of-fit statistics for both measures were excellent. Examination of two the longitudinal SEM causal path models followed. Model C generally produced good fit (a reciprocal cross-lagged model with both one-way and reverse structural paths from T1 sources of stress and control measures to T2 sources of stress and control measures). However, Model C1 overall produced an unacceptable fit to the data (a reciprocal cross-lagged model with both one-way and reverse structural paths from T1 outcome measures and control measures to T2 outcome measures and control measures). Model comparisons revealed that Model C was significantly the best fitting model of the two. Finally, multi-group analysis was performed and indicated that all eight causal paths within final Model C were invariant across both groups. However, the multi-group analysis conducted on the final model representing H2 produced poor fit statistics across the two groups.

The SEM analysis conducted throughout section 12.3 partially supports H2. For example, both measurement models have excellent factor structures. The longitudinal cross-lagged reciprocal path model incorporating the stress and control variables produced a good fitting model (Model C). However, similar reciprocal Model C1 incorporating well-being and control variables did not exhibit good fit. Comparison of both models also statistically favoured Model C. Although the multi-group analysis associated with Final Model C estimated across groups did not produce good fit overall, the analysis nevertheless indicated that the causal structure of the model was invariant.

12.4 Structural Equation Modeling Analysis: Research Hypothesis Three – Stress, Well-Being & Work Performance

The final series of structural equation modeling (SEM) analysis shall now be conducted in relation to H3. Similarly to previous sections 12.2 and 12.3, this section consists of five major parts: hypothesised theoretical SEM for research hypothesis four (12.4.1), confirmatory factor analysis (CFA, 12.4.2), longitudinal cross-lagged SEM path analysis (12.4.3), multi-group analysis of the final longitudinal cross-lagged SEM (12.4.4) and a summary of the all the SEM for hypothesis four (12.4.5).

12.4.1 Hypothesised Theoretical Structural Equation Model for Research Hypothesis Three

Figures 3.12 and 3.12a show the SEM hypothesised model for H3:

H3: There is a reciprocal relationship between stress, well-being and work performance in the workplace, non-work and context-free domains of life.

Cross-lagged arrows directed away from latent variables at time one (T1) to latent variables at time two (T2) represent both causal paths between stress and work performance across work and non-work domains (Figure 3.12) and causal paths between well-being and work performance across work, non-work and context-free domains (Figure 3.12a). Arrows estimated simultaneously indicate a reciprocal model.

As with similar hypothesis conducted throughout Chapter Thirteen, the principles mentioned above refer to both Figure 3.12 and the accompanying Figure 3.12a. The models differ in that the sources of stress variables shown in Figure 3.12 (work and non-work stress) are replaced by the outcome measures variables shown in Figure 3.12a (work, non-work and context-free well-being). Both the stress and well-being variables are estimated along-side the outcome variable work performance.

Figure 3.12: Hypothesised Theoretical Structural Equation Model for Research Hypothesis Three

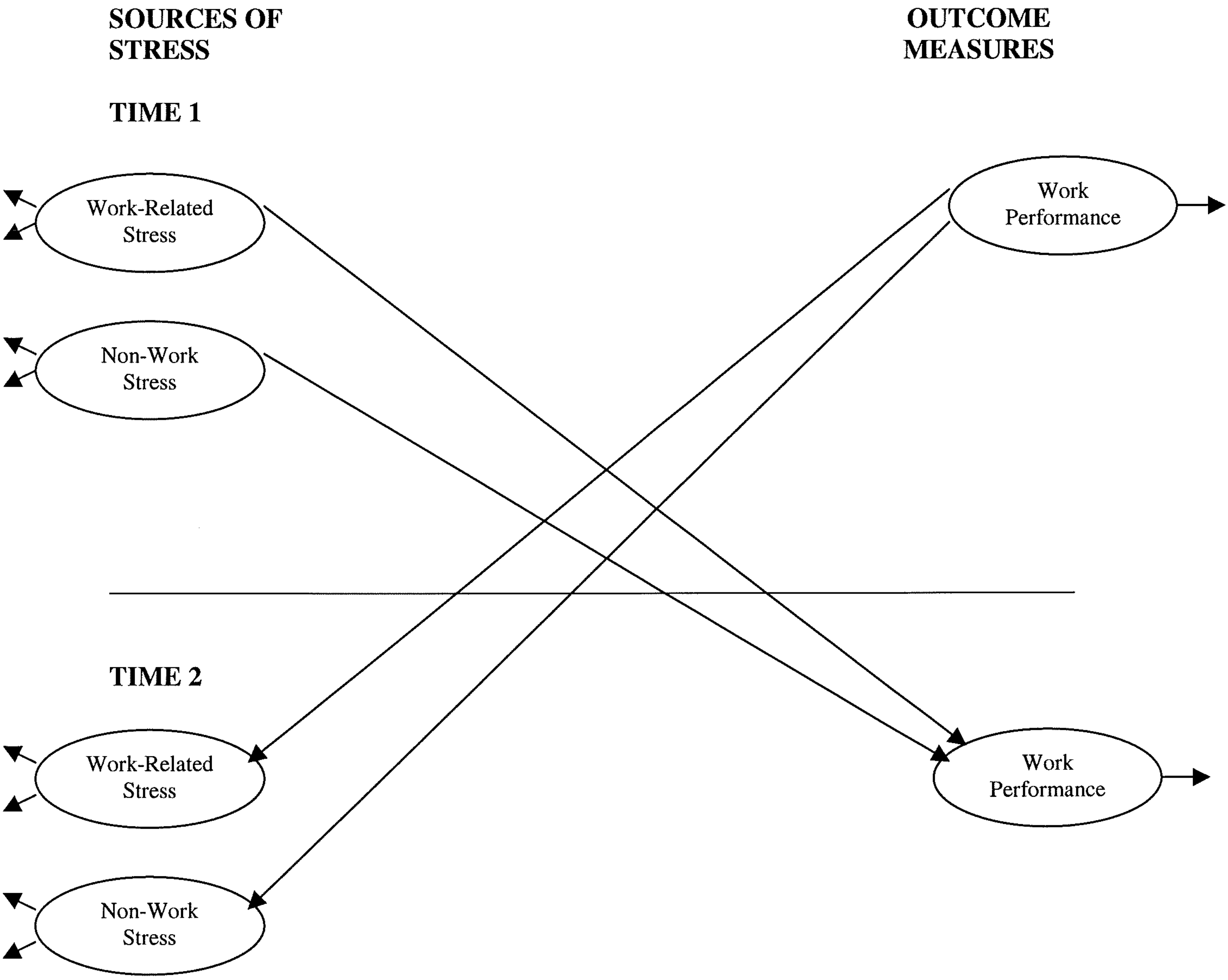
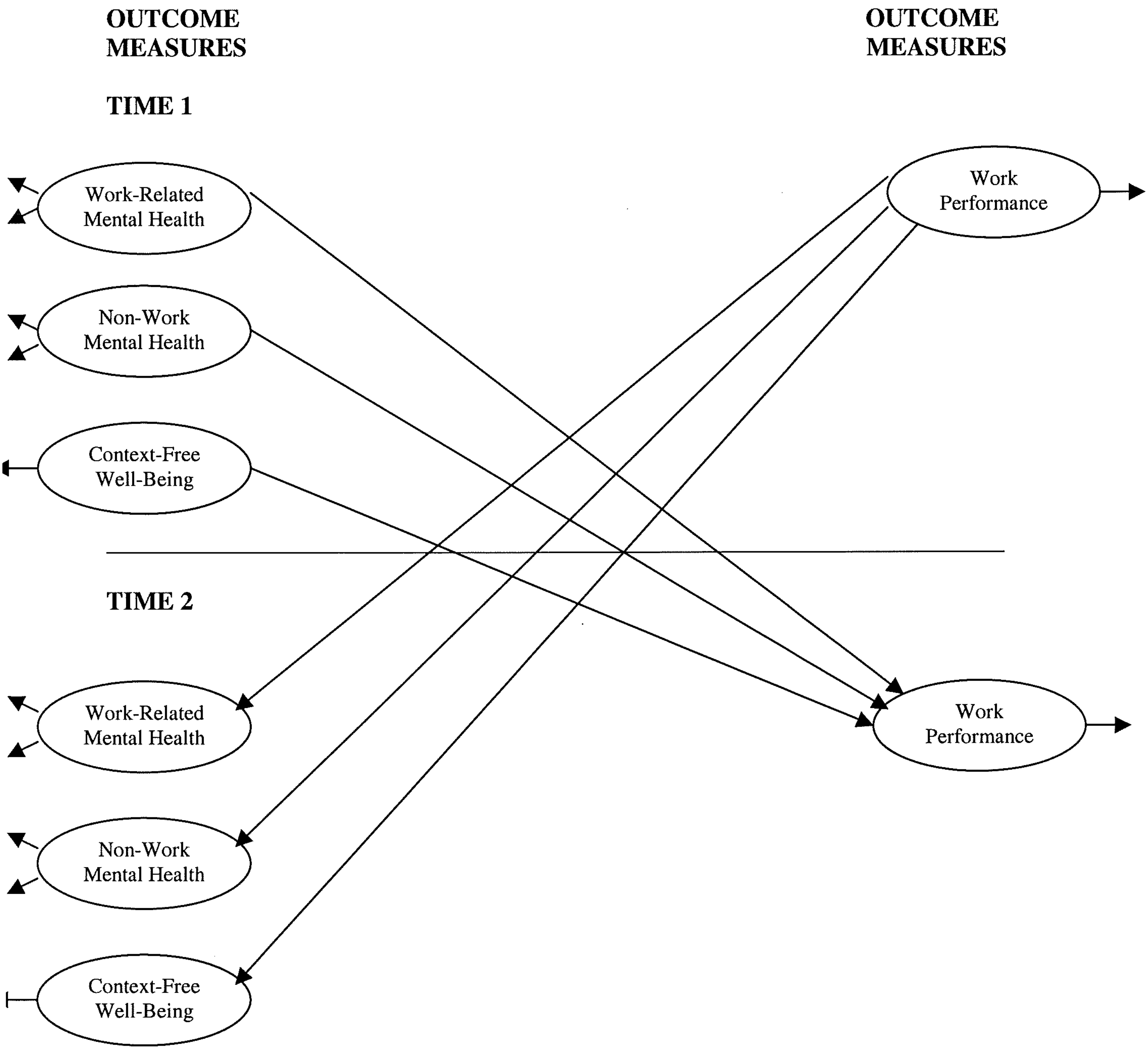


Figure 3.12a: Hypothesised Theoretical Structural Equation Model for Research Hypothesis Three



12.4.2 Confirmatory Factor Analysis of the Measurement Model

This section shall discuss issues concerned with the estimation of the CFA measurement model associated to H3. Again as with H2, issues concerning assumptions, identification, procedure etc within CFA estimation was discussed earlier within Chapter Twelve (section 12.2.2). CFA relating to the present research should be read alongside Chapter Eight.

Scale measurements used in relation to H3 analysed from the pooled working/non-working students and trainee nurses sample consisted of a large sample size of 993.

All cases shall be deleted from the analysis where there is missing data.

12.4.2.1 Work Performance

First-order CFA was performed to examine the measurement model of the work performance scale (Guppy & Marsden, 1997) consisting of three observed items (see Chapter Eight, section 8.6.1.4 for a discussion on the measures item content). Error associated with the three observed variables and regression weights have been constrained as standard procedure (see Bryne, 2001). See Appendix 3.12 for an AMOS representation of the outcome of the analysis (observed variables workper1, workper2 and workper3 represent items 1-3 in the questionnaire).

The chi-square statistic produced a non-significant value of 0.47 (df = 1) which reflects a ratio below three involving dividing the chi-square value by the degrees of freedom. This reflects good fit. The three goodness of fit statistics also produced excellent fit to the data for the work performance scale (GFI = .99, NFI = .99, and CFI = .99), thus revealing that this measurement model used within the present analysis strongly fits the data from the working/non-working students & trainee nurses sample (see Table 3.22). Modifications to the model were not necessary.

Table 3.22: Summary of all the Confirmatory Factor Analysis Measurement Model for Hypothesis Three: Chi-Square & Goodness of Fit Statistics

Measurement Model	Chi2	d.f.	GFI	NFI	CFI
Work Performance	0.47	1	.99	.99	.99

Since work performance is solely measured within a workplace environment, no additional accompanying measures reflecting performance within other life domains is appropriate as it was for other hypothesis elsewhere throughout Chapter Twelve.

12.4.3 Longitudinal Cross-Lagged Structural Equation Path Model Analysis

The hypothesised SEM in Figure 3.12 and Figure 3.12a reflecting H3 shall now be estimated to examine whether the model fits the pooled working/non-working students and trainee nurses data. As mentioned in regards to all longitudinal SEM causal models throughout Chapter Twelve, section 12.4.3 will estimate models with sample sizes of 179.

It should once again be noted that both models within the present section shall be calculated by investigating causal pathways between first order latent variables (work performance and context-free well-being) and second-order latent factors (work-related stress and mental health and non-work stress and mental health). Again, covariances will be imposed between error residuals that are associated to observed variables that are the same across life domains and over time periods as within the former analysis conducted within previous sections in the current research. Similarly, as with all analysis performed within the current related sections, residual error terms are associated with the three endogenous latent variables at T2 for both Model C (Figure 3.12) and Model C1 (Figure 3.12a). Also again, covariances are conventionally imposed between the T1 work stress latent variable and T1 work performance latent variable (Figure 3.12) and between T1 work-related outcome measures latent variable and T1 work performance latent variable (Figure 3.12a).

Similarly to H2 (section 12.3.3), competing models will be again estimated alongside one another in order to address this time H3. Also, since complete models for both Models C and C1 in regards to H3 again contain less parameters to be estimated than for H1 and H2 (in that the work performance variable only contains one observed variable within one single domain), longitudinal reciprocal models that consider all variables over time shall be analysed where possible. Thus, Model C is a full model, however Model C1 has been reduced. Issues in relation to identification were discussed previously within Chapter Twelve. These two competing models will be estimated in order to address H3:

> Model C: a simultaneously estimated reciprocal cross-lagged model with one-way and reverse structural paths from time one (T1) sources of stress and work performance to time two (T2) sources of stress and work performance. The stress measures at both time phases represent both work and non-work life domains.

Model C1: a simultaneously estimated reciprocal cross-lagged model with one-way and reverse structural paths from time one (T1) outcome measures and work performance to time two (T2) outcome measures and work performance. The outcome measures (well-being) at both time phases represent work and non-work life domains.

An investigation of model comparisons between the two models representing H3 shall then be followed and discussed accordingly.

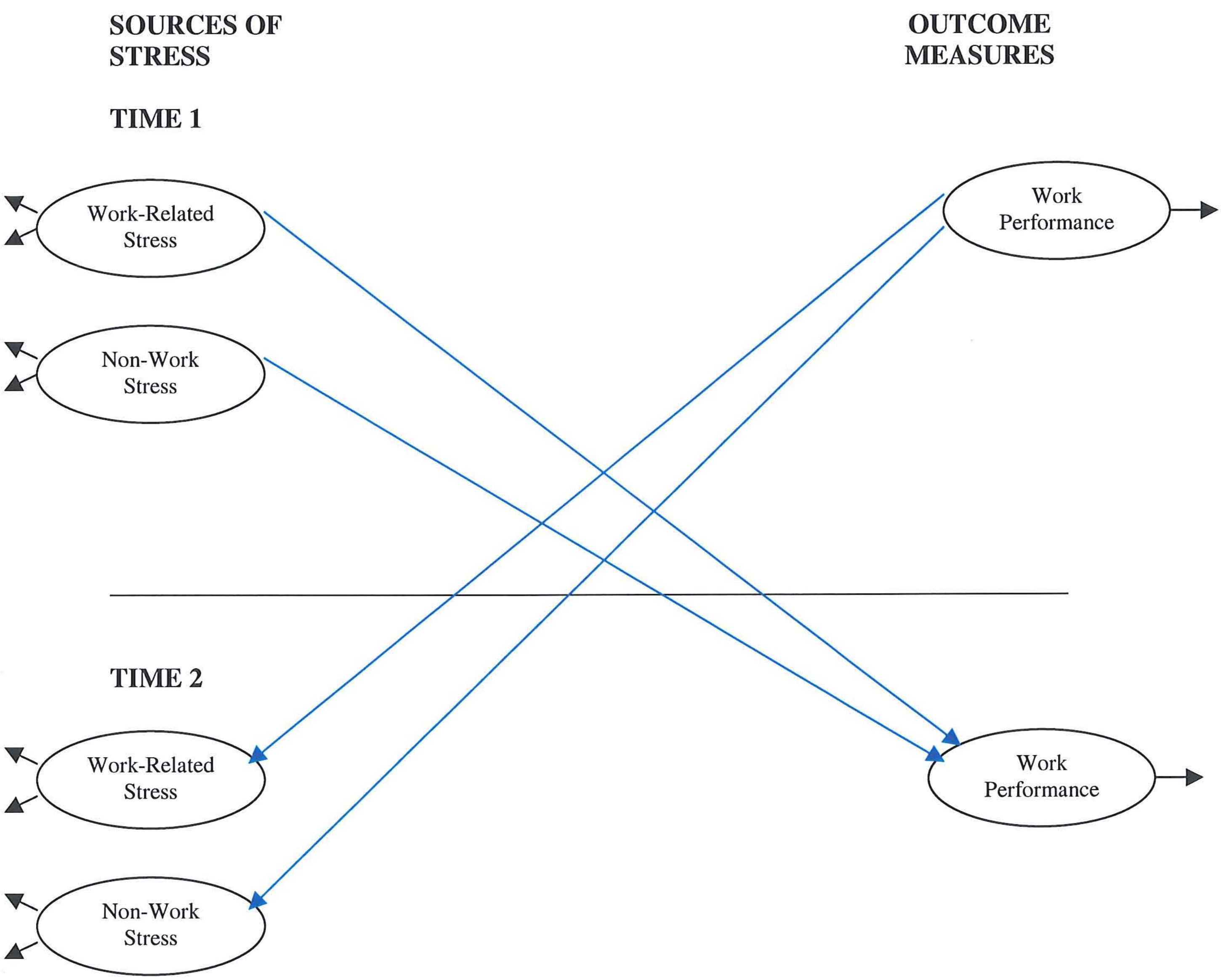
As with H2, the reason for naming the two models above as Models C and Model C1 has been incorporated in order to remain consistent with other similar reciprocal models within earlier sections that were also referred to as Models C (i.e. 12.2.3 and 12.3.3).

12.4.3.1 Model C

Model C will test a reciprocal cross-lagged model with both one-way and reverse structural paths from T1 sources of stress (work-related and non-work stress) and work performance (work-related) to T2 the same sources of stress and work performance outcome measures.

The associations of interest within the analysis for Model C are reflected by the four blue arrows that address both the one-way and reverse reciprocal cross-lagged relationships between work/non-work stress and work performance at T1 and T2 (see Figure 3.13). The chi-square value for Model C was significant at 41.18 (23 df). Fit statistics reveal a good to excellent fitting Model to the data set (GFI = .96 NFI = .92 and CFI = .96). Analysis of the model modifications indicated that there were no theoretically justified amendments to be made to Model C.

Figure 3.13: Estimated Longitudinal Cross-Lagged Structural Equation Model for Research Hypothesis Three: Model C



Chi-Square = 41.18 (23 df)
P = .00
GFI = .96
NFI = .92
CFI = .96

Due to limited research that shows the likely causal patterns of associations between particular variables related to H3, indication of the expected direction of relationships amongst variables is unknown (refer to Chapter Four: Theories & Models of Work Performance).

Table 3.23 displays the standardised regression weights for the four causal pathways estimated simultaneously for Model C. Regression coefficients for the model range from .03 to .74. It should again be noted that work performance is reversed scored, therefore low scores represent greater work performance. The strongest associations within the model are the two one-way causal pathways from work-related stress to work performance (.74) and from non-work stress to work performance (-.66). These two regression coefficients indicate that low levels of stress at work influence greater work performance and that low levels of non-work stress influence lower levels of work performance in respondents. Table 3.23 reveals that these causal paths have the strongest effect upon reciprocal Model C. Within this good fitting model, the reverse causal influences of work performance upon work-related stress (.12) as well as non-work stress (.03) did not produce strong regression weights. Regardless, these two causal paths indicate that greater levels of work performance influence low levels of both work-related and non-work stress. Within Model C it can also be seen that the two domain specific relationships produced stronger standardised regression coefficients than the non-domain specific associations (see Table 3.23).

Table 3.23: Summary of the Standardised Regression Weights for the Longitudinal Cross-Lagged Structural Equation Model for Research Hypothesis Three: Model C

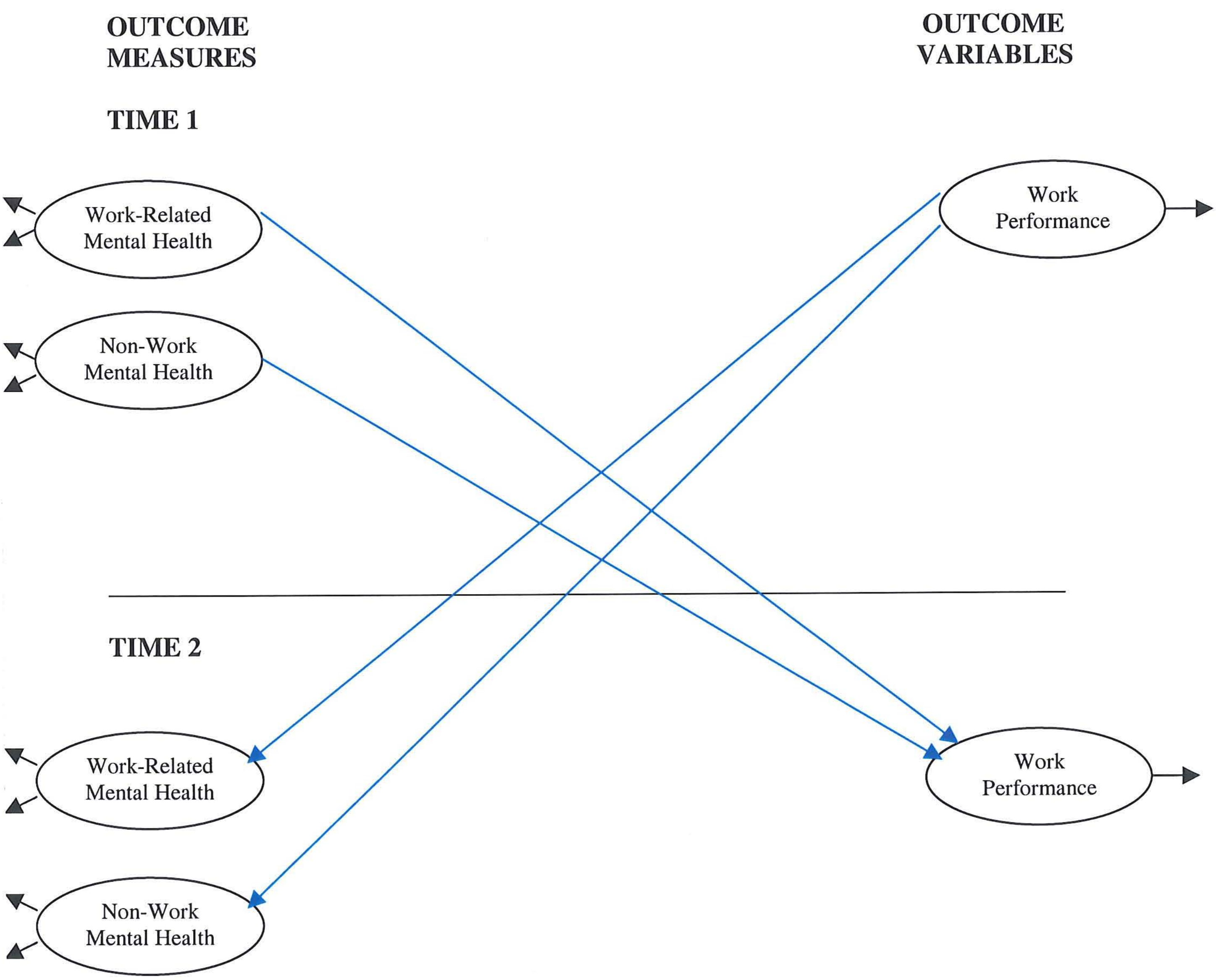
Standardised Regression Weights	Estimates
Work-Related Stress > Work Performance	.74
Non-Work Stress > Work Performance	-.66
Work Performance > Work-Related Stress	.12
Work Performance > Non-Work Stress	.03

12.4.3.2 Model C1

Model C1 shall now investigate a reciprocal two-way cross-lagged model with both one-way and reverse structural paths from T1 outcome measures (work and non-work well-being) and work performance measures to T2 outcome measures (work and non-work well-being) and work performance.

The associations of interest within Model C1 are represented by the four blue arrows that concern the one-way and reverse reciprocal cross-lagged causal pathways between mental health and work performance across work and non-work domains of life (see Figure 3.14). The chi-square statistic for Model C1 was significant at 166.95 (26 df). Fit indices produced poor fit values indicating that Model C1 does not fit the working/non-working students and trainee nurses data set (GFI = .84 NFI = .81 and CFI = .83). Model modification statistics indicated that there were no theoretically justified changes to be made to Model C1.

Figure 3.14: Estimated Longitudinal Cross-Lagged Structural Equation Model for Research Hypothesis Three: Model C1



Chi-Square = 166.95 (26 df)
P = .00
GFI = .84
NFI = .81
CFI = .83

All the one-way and reverse causal paths between work/non-work well-being and work performance have a negative relationship (i.e. greater levels of well-being within work and non-work contexts are associated with greater levels of work performance).

The regression coefficients for the four causal pathways estimated simultaneously for Model C1 are shown in Table 3.24. Coefficients for the model range from -.02 to -.99. The strongest relationship within the model is the causal pathway from work-related well-being to work performance (-.99). This finding shows that greater perceived work-related well-being influences greater levels of work performance. The other domain-specific reverse causal influence of work performance upon work-related well-being (-.22) produced the next greatest effect within Model C1 (indicating that greater levels of perceived work performance effect greater levels of well-being). The non-domain specific associations didn't produce strong regression paths. For example, the effects of non-work mental health upon work performance (-.07) and the reverse association, the effects of work performance upon non-work mental health (-.02).

Table 3.24: Summary of the Standardised Regression Weights for the Longitudinal Cross-Lagged Structural Equation Model for Research Hypothesis Three: Model C1

Standardised Regression Weights	Estimates
Work-Related Mental Health > Work Performance	-.99
Non-Work Mental Health > Work Performance	-.07
Work Performance > Work-Related Mental Health	-.22
Work Performance > Non-Work Mental Health	-.02

12.4.3.3 Model Comparisons

Table 3.25 displays a summary of the goodness-of-fit indice statistics for both Model C and C1 alongside model comparisons related directly to H3: *There is a reciprocal* *relationship between stress, well-being and work performance in the workplace, non-work and context-free domains of life.*

Model C represents a reciprocal cross-lagged model with both one-way and reverse structural paths from T1 sources of stress (work-related and non-work stress) and work performance to T2 the same sources of stress and work performance measures. Similarly, Model C1 represents a reciprocal two-way cross-lagged model with both one-way and reverse structural paths from T1 outcome measures (work and non-work mental health) and work performance to T2 the same outcome and work performance measures. See Figures 3.13 and 3.14 respectively. As with all comparison of models throughout Chapter Twelve, the two models were compared by the chi-square difference test (Bentler & Bonett, 1980 and Joreskog & Sorborm, 1993). The chi-square difference test showed that the difference between the two models is significant (Model C vs Model C1: Chi2 (3) = 125.77, p< .001) revealing that Model C better accounts for the working/non-working students and trainee nurses pooled data set than Model. Thus, there is statistical evidence that a causal two-way reciprocal cross-lagged model between work/non-work stress and work performance mutually influence one another represented by Model C.

Table 3.25: Summary of the Longitudinal Cross-Lagged Structural Equation Path Models C & C1 for Research Hypothesis Three: Goodness-of-Fit Statistics & Model Comparisons

Model	Chi2	d.f.	GFI	NFI	CFI
Model C	41.18	23	.96	.92	.96
Model C1	166.95	26	.84	.81	.83
Model Comparisons	**Chi2Diff**		**d.f**		**P Value**
Model C & Model C1	125.77		3		sig***

p < .001***

It would appear from the evidence of the model comparisons and considering the overall best fit within section 12.4.3, that the best fitting model in regards to H3 is Model C.

12.4.4 Multi-Group Invariance Analysis of the Final Longitudinal Cross-Lagged Structural Equation Path Model: Research Hypothesis Three

The following section shall perform multi-group analysis on two different data sets as was previously conducted within the current study for H1 and H2 in order to cross-validate findings more thoroughly.

The following section will test the invariance of the final best fitting longitudinal SEM causal pathways tested throughout section 12.4.3 in order to address H3 (Model C). The analysis will simultaneously use data from both the working/non-working students and trainee nurses pooled data as well as the university staff sample. The aim of the analysis is to determine whether the four estimated causal paths between the stress and work performance constructs are equal for both sets of data when constrained thus indicating invariance for Model C. See section 12.4.3.1 for a full breakdown of Model C's characteristics. It should be noted that in order for the multi-group analysis to be estimated, the covariance between work-related stress and work performance at T1 was removed due to identification problems. Issues relating to identification have been discussed throughout Chapter Twelve.

12.4.4.1 H3 Final Model

The same procedure that was conducted for the previous sections will be undertaken in relation to this time H3. Thus, the first stage of the analysis that estimates the causal structure between variables in a model is to establish a multi-group baseline model without constraints against which to compare following models where equality constraints are imposed. Model C representing H3 was estimated to act as a baseline point in determining the extent to which the causal paths are the same for both samples of data. The baseline model exhibited a chi-square value of 144.01 (50 df) with multi-group fit indice statistics ranging from poor to good (GFI = .92, TLI = .82 and CFI = .87).

The four causal paths were then constrained to be equal for both samples of data (Model Ca). Next the chi-square statistic was compared against the unconstrained baseline model. The chi-square statistic produced a value of 154.02 (54 df). Table 3.26 shows the difference in the chi-square value between the constrained model and the unconstrained baseline model, which is 10.01, with 4 df. This difference is not statistically significant at the .05 probability level. These results indicate that the causal structure shown in Model Ca is equivalent/invariant across the working/non-working students and trainee nurses pooled data and the university staff sample of data indicating cross-validation between groups. However, the model exhibited poor to good goodness-of-fit statistics (GFI = .91, TLI = .81 and CFI = .86).

The multi-group analysis conducted above shows that the equality constraints exhibited by the four causal paths in Model Ca hold consistent across both groups (see Figure 3.13).

Table 3.26: Multi-group Invariance Analysis of the Final Longitudinal Cross-Lagged Structural Equation Path Model for Research Hypothesis Three: Goodness-of-Fit Statistics & Model Comparisons

	Chi2	**d.f.**	**GFI**	**NFI**	**CFI**
Model C	144.01	50	.92	.82	.87
Model Ca	154.02	54	.91	.81	.86
Model Comparisons	**Chi2Diff**		**d.f**		**P Value**
Model C & Model Ca	10.01		4		non-sig

$p < .05^*$

Table 3.26 displays the final model representing H4 with complete measurement invariance for the four cross-lagged reciprocal causal pathways (Model Ca). Results from the multi-group invariance examination of the final longitudinal SEM path model for H3 investigating the stability of the causal structure across two samples of data shows that Model C with four causal path constraints is invariant. Nonetheless, generally, the model has unacceptable fit.

12.4.5 Summary of the Structural Equation Modeling Analysis for Research Hypothesis Three

Section 12.4 undertook the structural equation modeling (SEM) analysis to address H3 within the current research. The hypothesis states that:

There is a reciprocal relationship between stress, work performance and well-being in the workplace, non-work and context-free domains of life where appropriate.

Stress influences work performance as well as work performance influences stress. Work performance influences well-being as well as well-being influences work performance. The reciprocal relationship amongst the three variables will be consistent as depicted in Figure 1.10, 3.12 and 3.12a.

Initially, a hypothesised SEM model related to H3 was put forward. Confirmatory factor analysis followed this and was conducted on the single work performance scale used within the present study. Fit statistics for the scale were excellent indicating a good measurement model. An investigation of two longitudinal SEM causal models was then performed. Model C produced a good fit (a reciprocal cross-lagged model with both one-way and reverse structural paths from T1 sources of stress and work performance to T2 sources of stress and work performance). However, Model C1 produced a poor fit to the data (a reciprocal cross-lagged model with both one-way and reverse structural paths from T1 outcome measures and work performance to T2 outcome measures and work performance). Comparison of the two models not surprisingly showed that Model C was significantly the better fitting model. The final piece of investigation conducted within section 12.4 was a multi-group analysis. Findings suggest that all causal paths within final Model C are invariant for both groups of data. However, and similarly in relation to H2, the multi-group analysis undertaken on the final model reflecting H3 generally produced poor fit statistics across the two groups.

As with the results extracted from the various types of SEM in relation to both H1 and H2, the same analysis performed throughout section 12.4 this time partially supports H4.

For instance, the CFA measurement model for the work performance scale has an excellent factor structure. The longitudinal cross-lagged reciprocal path model incorporating the stress and work performance variables exhibited a good to excellent fitting model (Model C). However, similar reciprocal Model C1 that uses well-being and work performance variables did not exhibit good fit. Comparison between the two models also statistically favoured Model C. Multi-group analysis indicated that the causal structure of the stress/work performance reciprocal model was invariant across groups, although good fit overall was not produced.

12.5 Summary of Chapter Twelve

Chapter Twelve conducts extensive analysis using structural equation modeling (SEM) to determine whether the causal structure of variables outlined within the current study to address the three research hypothesis outlined are statistically significant. Methodological rigour was implemented within the analysis to strengthen findings by incorporating longitudinal and multi-sample data. Three separate sections within Chapter Twelve address each hypothesis and contain the same analytic procedure. The three sections consists of five main parts: hypothesised theoretical SEM for each particular research hypothesis, confirmatory factor analysis (CFA), longitudinal cross-lagged SEM path analysis, multi-group analysis of the final longitudinal cross-lagged SEM and a summary of the all the SEM for each specific hypothesis.

Analysis within section 12.2 was performed to determine whether there is a reciprocal relationship between stress and well-being in the workplace, non-work and context-free life domains. Fit indice statistics from the CFA for each scale varied from acceptable to excellent. Statistical evidence from section 12.2.3 (Longitudinal Cross-Lagged SEM Path Model Analysis) indicated that Model C, a reciprocal cross-lagged model with both one-way and reverse structural paths from T1 sources of stress and outcome measures to T2 sources of and outcome measures across domains, was the best fitting model (see Figure 3.4). Analysis also found that this final best fitting Model C fitted the data better without the additional influence of negative affectivity. Multi-group analysis further suggested that all the causal paths within final Model C were invariant across both groups of data used within the current research. The SEM analysis performed throughout section 12.2 partially supports H1.

Section 12.3 conducted the SEM analysis to address H2 within the present research. The hypothesis states that there is a reciprocal relationship between stress, control and well-being in the workplace, non-work and context-free domains of life. Goodness-of-fit statistics for both work and non-work control measures were excellent. Model C overall produced good fit (a reciprocal cross-lagged model with both one-way and reverse structural paths from T1 sources of stress and control measures to T2 sources of stress and control measures). However, the accompanying Model C1 produced an unacceptable fit to the data (a reciprocal cross-lagged model with both one-way and reverse structural paths from T1 outcome measures and control measures to T2 outcome measures and control measures). Comparison of the two models showed that Model C was significantly the best fitting model (see Figure 3.10). Multi-group analysis indicated that the causal paths within final Model C were invariant across both groups of data.

However, it was revealed that the multi-group analysis conducted on the final model exhibited poor fit. The analysis conducted throughout section 12.3 partially supports H2.

SEM analysis was conducted within section 12.4 to address H3 which states that there is a reciprocal relationship between stress, work performance and well-being in the workplace and non-work domains of life where appropriate. CFA conducted on the single work performance measure produced excellent goodness-of-fit statistics. Model C also produced a good fit to the data (a reciprocal cross-lagged model with both one-way and reverse structural paths from T1 sources of stress and work performance to T2 sources of stress and work performance). See Figure 3.13. However, Model C1 produced a poor fit (a reciprocal cross-lagged model with both one-way and reverse structural paths from T1 outcome measures and work performance to T2 outcome measures and work performance). Comparison of the two models revealed that Model C was significantly a better fitting model. Results from the multi-group analysis indicated that the causal pathways within final Model C are invariant across groups. However, multi-group analysis performed on the final model exhibited poor fit to the data sets. Similarly to H1 and H2, the SEM analysis partially supports H3.

The results of the analysis regarding all three sections in relation to the three hypothesis shall be discussed in detail within the final SECTION D: DISCUSSION.

SECTION D: DISCUSSION

Within final SECTION D, the findings from SECTION C: RESULTS are discussed at length. The opening Chapter discusses the results found within the current research that relate to H1, the relationship between stress and well-being. Chapter Fourteen then follows and discusses models that were examined that address the relationship between stress, well-being and control (H2). Chapters Fifteen follows the same pattern as the previous two chapters and discuss findings within the current study that refer to the causal associations between stress, well-being and work performance (H3). Chapter's Thirteen-Fifteen all contain the same sub-sections in order to give SECTION D flow and structure (overview, summary of results, evaluation of results and a summary of the chapter). A chapter then discusses methodological issues and concerns in regards to the present research (Chapter Sixteen). SECTION D and the whole of the thesis then finishes with final Chapter Seventeen that concludes the work within the current study and puts forward ideas for future research.

CHAPTER THIRTEEN: EVALUATION OF RESEARCH HYPOTHESIS ONE - STRESS AND WELL-BEING

13.1 Overview of Chapter Thirteen

Chapter Thirteen begins SECTION D by discussing the results obtained within SECTION C (Chapter Twelve, section 12.2) in relation to the association between stress and well-being. Issues relating to H1 are outlined and begin with a summary of the main findings produced within the current research. Section 13.3 then considers the research results in relation to other similar previous studies conducted over the years with special reference to Warr's (1987) model which encapsulates occupational stress and psychological well-being within non-work contexts in particular. Within the same section, Figure 1.9 in relation to the present research conducted is examined which reflects inconsistent and never before examined causal pathways between stress and well-being constructs. Following on from this, section 13.3 comprehensively discusses comparisons between the current research results and that of De Jonge et al (2001). An outline of the Chapters content is then summarised.

13.2 Summary of Results within the Current Research: Hypothesis One

Structural equation modeling analysis within the current study was conducted within Chapter Twelve to examine whether a reciprocal relationship between stress and well-being in the workplace, non-work and context-free domains exists.

In order to address H1, a series of confirmatory factor analysis of all the measurement models was performed firstly. Fit statistics for each particular measure varied from acceptable to excellent. However, the majority of scales exhibited excellent fit (see Chapter Twelve, section 12.2.2). Longitudinal causal path Models A, C and A1 produced excellent fit, Model B produced acceptable to good fit and Models B1 and C1 exhibited poor fit (see section 12.2.3 for further information regarding each model). Model comparisons revealed that Model C (a reciprocal cross-lagged model with both one-way and reverse structural paths from T1 sources of stress (work-related stress) and outcome measures (work-related mental health) to T2 sources of stress (work and non-work related stress) and outcome measures (work, non-work and context-free well-being) was the best fitting model. Additional analysis discovered that final Model C reflecting H1 best fitted the data without the effects of negative affectivity. Multi-group analysis with the addition of the university staff sample suggested that all the causal paths within Model C were invariant.

13.3 Evaluation of Results within the Current Research: Hypothesis One

The following sections shall evaluate findings from the current study relating to H1 (relationship between stress and well-being). Model C from section 12.2 within Chapter Twelve shall be referred to mainly throughout the following sections as this represented the best fitting model. Discussion will consider the results from this study in relation to previous research conducted (refer mainly to Chapter One and Chapter Five).

13.3.1 Previous Research: Consistencies, Contributions & Revisions

Firstly, the present research builds upon models by both Cooper (1986) and Warr (1987). However, more similarities are apparent within Warr's model, which considers outside of work effects upon employee's lives such as non-work and context free well-being and both affective and mental health components.

Based upon ideas from Warr (1987) regarding spillover between both stress and well-being, the current research findings appear inconclusive in relation to the work conducted by Frone et al (1992) who discovered that stress and well-being variables are associated greater if they are domain specific in nature. For example, Frone et al (1992) suggests that work and non-work stressors are related to their within-domain work and non-work well-being outcome measures respectively. The current study indicates that the best fitting Model C as well as Models A and C1 within section 12.2 do report this pattern of association. However, alternative Models B, A1 and B1 do not. Hart (1999) states that work and non-work contexts operate along separate paths indicating a segregation model as opposed to a spillover model. However, in regards to the best fitting model within section 12.2 with excellent goodness of fit statistics (Model C), research within the present study overall favours a spillover model. For example and unlike Hart (1999), Model C exhibits strong reciprocal non-domain specific spillover causal paths between work/non-work stress and work/non-work/context-free well-being measures (see Figure 3.4). Nonetheless, the strongest causal pathways across all six Models within the present study is the relationship between work/non-work stress and context-free well-being. This is regardless of whether the association is one-way, reverse or reciprocal in causal direction, thus supporting the concept that outside of work psychological experiences have an influence upon employees workplace stress (i.e. work and non-work stress effect context-free well-being as well as context-free well-being effects work and non-work stress). These types of models provide evidence in support of the presence of work-life balance issues. This finding is consistent with Frone et al (1991). Model C was also found to be consistent across two samples of data within the present study thus further supporting the model.

Following on from the above discussion, when considering specific causal effects between variables within a particular model as a measure of strength as opposed to whole simultaneous global models, findings from the current research are similar to evidence from other studies. Rogosa, 1980, also notes that simply examining the existence of cross-lagged effects as a whole model is an oversimplification of the research problem and suggests that specific causal effects as a measure of strength should also be investigated. For example, Edwards & Rothbard (1999) showed that within a work context, stress is more strongly associated to workplace well-being than to both non-work and context-free well-being. This is also the case for the current research in relation to the comparison between work and non-work well-being, however, workplace stress is not more strongly related to workplace well-being than workplace stress is to context-free well-being (see Model C, Figure 3.4). Nevertheless, this and other previous research indicates that stressors are more strongly related to within-domain specific well-being than to across-domain well-being be it work or non-work.

The current research expands on Warr's (1987) model by introducing the idea that stress and well-being could be reciprocally associated and introduces non-work well-being as a distinct additional influential factor within occupational stress research (separate and distinct from context-free well-being). This is also based upon the ideas by other authors who suggest that future research examining models measuring the relationships between stress and well-being (including reciprocal associations) should be investigated (Spector et al, 1988 and Zapf et al, 1996). As mentioned within the Introduction, the limited research that has been performed investigating this association has produced inconsistent results (James & Jones, 1980, Bateman & Strasser, 1983, Kohn & Schooler, 1982, James & Tetrick, 1986, Marcelissen et al, 1988, Glickman et al, 1991, Schonfeld, 1992, Schwarzer et al, 1993, Taris et al, 1998 and de Jonge et al, 2001). Best fitting reciprocal Model C (Figure 3.4) within the current research supports a transactional model of stress supported by Edwards (1992). This model indicates that work-related stress experienced by employee's influences their work, non-work and context-free well being and that workplace well being similarly influences both stress levels at work and outside of the workplace. However, accompanying reciprocal Model C1 (Figure 3.7) does not exhibit good fit. This therefore indicates that mental health well being reflected by both competence and aspiration better fits a reciprocal model with stress than does affective well being represented by both anxiety-contentment and depression-enthusiasm.

Figure 1.9 within the Introduction represents inconsistent and never before examined causal pathways between stress and well-being variables within occupational health research. A full and complete reciprocal model with 12 causal pathways presented in Figure 3.1 representing Figure 1.9 was not viable as a simultaneous model within the current studies analysis due to various identification, estimation and sample size problems. Only a single complete model with all 12 causal links would enable a thorough investigation of all the causal pathways within Figure 1.9. However, the best fitting model within section 12.2 reflecting H1 was nevertheless a restricted two-way, cross-lagged, longitudinal reciprocal model. Most of the findings from this model have been discussed beforehand within this Chapter. Interesting relationships between particular variables shown in Figure 1.9 not so far discussed within the current Chapter will now be discussed in relation to the present studies results.

Firstly, good fitting Model A representing a one-way cross-lagged relationship between stress and mental health well-being across domains (see section 12.2.3.1 and Figure 3.2) shows that although workplace stress influences work, non-work and context-free well-being, the same pattern is also apparent for non-work stress upon the same set of well-being constructs (i.e. low levels of stress experienced outside of work influences greater levels of work, non-work and context-free well-being). However, well-being is represented by affective well-being measures as opposed to mental health measures. These findings in particular emphasise the strong effects of non-work stressors upon a person's sense of well-being across all aspects of life.

Secondly, approaching good fit Model B reflecting a reverse cross-lagged association between mental health well-being (competence and aspiration) and stress again across domains indicates that work, non-work and context-free well-being influences work and non-work stress. (i.e. greater levels of well-being experienced across domain influences lower levels of work and non-work stress (see section 12.2.3.2 and Figure 3.3). This model produces further evidence of the influence of non-work psychological well-being upon stress, especially work stress. For instance, two of the strongest regression weights within Model B are the causal pathways from non-work mental health to workplace stress and similarly from context-free well-being to workplace stress. Thus, greater levels of outside of work well-being appear to influence lower levels of stress experienced at work.

Thirdly, best fitting Model C has been discussed earlier within this Chapter which represents a reciprocal cross-lagged relationship between mental health (competence and aspiration) and stress across domains (see section 12.2.3.3 and Figure 3.4). However, the influence of work-related well-being upon non-work stress has been distinguished as an area of research that has produced inconsistent results reflected within Figure 1.9. Although within the model it is the weakest causal path, since the model exhibits excellent fit it nonetheless suggests that work-based psychological processes have an effect upon non-work stressors.

Excellent fitting Model A1 represents the same causal relationships discussed in regards to Model A mentioned earlier and therefore further supports the associated causal pathways (see section 12.2.3.4 and Figure 3.5). However, Model A1 estimates affective well-being rather than mental health as outcome measures. Models B1 and C1 both were poor fitting models. This further establishes that mental health well-being (competence and aspiration) is greater associated with one-way, reverse as well as reciprocal models of occupational stress than affective well-being (anxiety-contentment and depression-enthusiasm). For example, greater levels of psychological competence and aspiration experienced by individuals (as opposed to affective well-being) within their work and non-work lives effect workplace and outside work stressors. However, perhaps the reason affective well-being measures for longitudinal Models B1 and C1 did not produce good fitting models as opposed to Models A, B and C is due to affective well-being constructs being less stable measures over time.

Since complex longitudinal models require huge sample sizes in order to estimate a whole model, less complex models examining associations between a smaller number of variables was preferable within the current research. Therefore, the present study incorporated the same analytic procedure as De Jonge et al (2001) where a number of competing stress and well-being models were tested in a number of sequential steps (see section 12.2.3 for further details). The following directly compares findings between this study in relation to stress and mental health outcomes (Models A, B and C) and De Jonge et al's (2001) study.

Similar one-way cross-lagged models examining the effects of sources of stress (T1) upon psychological well-being outcomes (T2) were conducted within De Jonge et al's (2001) study and the current study reflected in Model A (see Figure 3.2). Results from both studies provide statistical evidence to support this model. Alternatively, reverse cross-lagged models testing the influence of psychological outcomes (T1) upon sources of stress (T2) were also performed this time represented by Model B (see Figure 3.3). Results from De Jonge et al (2001) reveal no evidence to support the model. The current research produced acceptable to good fit for the model. Reciprocal cross-lagged models examining the mutual effects of sources of stress (T1) upon psychological well-being outcomes (T2) as well as the effects of psychological outcomes (T1) upon sources of stress (T2) were further conducted within both De Jonge et al's (2001) study and the current study reflected in Model C (see Figure 3.4). Results from De Jonge et al's (2001) work shows some weak evidence of cross-lagged effects. However, findings from this research produced an excellent fitting reciprocal model.

Model comparisons suggests that a one-way cross-lagged model examining the effects of sources of stress (T1) upon psychological well-being (T2) was the best fitting model within De Jonge et al's (2001) study. However, a reciprocal cross-lagged model examining the mutual effects of sources of stress (T1) upon psychological outcomes (T2) and the effects of psychological outcomes (T1) upon sources of stress (T2) was the best fitting model via model comparisons within the current research. It would therefore seem that both the current research findings and De Jonge et al's (2001) research have similarities, overlap as well as inconsistencies. For example, both set of results support a one-way cross-lagged model represented by Model A as a good fitting model. Both studies least favours a reverse cross-lagged model reflected by Model B. The current studies findings support a reciprocal cross-lagged model as a good fitting model represented by Model C whereas De Jonge et al (2001) only partially supports such a model.

Best fitting one-way cross-lagged model within De Jonge et al's (2001) study further underwent cross-validation in order to test the model's robustness. Results from the analysis suggest that the model is stable. Similarly, the current studies best fitting reciprocal Model C was also investigated via multi-group analysis in order to cross-validate results and also revealed that causal paths within the Model were stable across groups of data.

Closer inspection of specific individual causal effects within De Jonge et al's (2001) study that are specifically related to the current research reveal a negative relationship between work stressors at T1 and job satisfaction at T2 (-.18). Both Models A and C within the present study produced much stronger regression weights for this association with values of -.65 and -.90 respectively (see Table 3.7 and 3.9). Results form De Jonge et al (2001) also indicated within the same model that emotional exhaustion reflecting job strain (T1) also influences stress (T2) showing an indication of reciprocal effects between sources of stress and outcome measures of well-being (.11). Reciprocal Model C within the current research produced a much greater regression coefficient (-.93). Findings from these significant causal pathways within both the present study and De Jonge et al's (2001) research further supports the importance of considering reciprocal effects between stress and well-being within the workplace. Although De Jonge et al's (2001) study measures somewhat different constructs of stress and well-being to that of the current research within the occupational stress research field, nonetheless, for comparison purposes both studies reflect aspects of job characteristics and psychological outcomes.

Both the current study and De Jonge et al's (2001) study incorporate negative affectivity within models in order to determine whether it acts as a confounder between the stress and well-being relationship (see Chapter Three and section 12.2.3.8 within Chapter Twelve). Dollard & Winefield (1998 in De Jonge) indicate that negative affectivity can lead to an exaggeration between the stress-well-being relationship. Both the current study and De Jonge et al (2001) found that overall negative affectivity had no impact on stress/well-being associations.

There are many similarities between this study and De Jonge et al's (2001) research such as both studies investigate one-way, reverse and reciprocal relationships between stress and outcome measures using SEM, both examine cross-validation techniques on data, both studies are longitudinal in design and control for third variables (negative affectivity). However, there are apparent differences. For example, models used within the analysis for the current research expands upon De Jonge et al's (2001) work and therefore further contributes to the research field by including non-work and context-free variables during estimation. De Jonge and colleagues (2001) only estimate work related variables but recommend that more complex models need exploring. Also, the current research examines cross-validity via individual multi-group analytic techniques using SEM whereas De Jonge et al's (2001) research examines cross validity through splitting data into two sub-samples, a less robust approach acknowledged by De Jonge et al (2001). The present research tests measurement model analysis incorporating confirmatory factor analysis (CFA) unlike De Jonge et al's (2001) research. Confirmatory factor analysis is an important prerequisite within SEM prior to causal analysis to examine that the scales used within the research have good fit and are psychometrically reliable before further analysis is performed (see section 12.2.2 within Chapter Twelve). The current study also contributes to this type of reciprocal, cross-lagged, longitudinal occupational stress research performed previously by De Jonge et al (2001) and others by further introducing the effects of other variables such as coping, control and work performance which shall be discussed within the following Chapters.

It can be concluded that the analysis conducted within section 12.2 (Chapter Twelve) partially supports H1. For example, the measurement models, longitudinal cross-lagged SEM path models, comparison of models and multi-group analysis that are all associated to Model C support the hypothesis.

13.4 Summary of Chapter Thirteen

Chapter Thirteen presents a discussion of the structural equation modeling (SEM) results that was conducted within the current research in relation to H1 within Chapter Twelve (section 12.2). To refresh, the hypothesis puts forward that:

There is a reciprocal relationship between stress and well-being in the workplace, non-work and context-free domains of life.

Both stress influences well-being as well as well-being influences stress. The reciprocal relationship between the two variables will be consistent across the three domains of life as depicted in Figure 1.9, Figure 1.10 and Figure 3.1.

Initially, a summary of the main findings from the current study was outlined which indicated that a reciprocal cross-lagged Model C was overall best fitting model. This was followed by a detailed section (13.3) that evaluates findings from the current research in regards to the relationship between occupational stress and psychological well-being. This section firstly relates the present studies results and contributions with similar previous research conducted measuring concepts associated with H1. It was found within the current research that the stronger models generally support a spillover type model where both work-related stress and well-being measures have an influence across work/non-work stress and work/non-work/context-free well-being measures. It was suggested that these results provide evidence to support the theory that both work and non-work stress/well-being factors have an interactive effect upon one another. Upon closer inspection of specific causal pathways it was shown that the strongest causal paths consistently within all six Models within the present study is the association between work/non-work stress and context-free well-being. It was also found that the current research expands upon previous studies by supporting a reciprocal model where stress and well-being across domain mutually effect one another.

Section 13.3 then goes on to examine further interesting findings in relation to H1. Discussion revolves around Figure 1.9 shown within Chapter One that reflects inconsistent and never before investigated associations between stress and well-being factors. In relation to Model B, results generally provide substantial evidence to support the influence of outside work effects upon occupational stress. Discussion also reveals that mental health well-being (competence and aspiration) has a greater relationship with stress factors incorporated within the current research than does affective well-being (anxiety-contentment and depression-enthusiasm).

Since the present research incorporates similar analytic procedures using SEM analysis as that of De Jonge et al (2001), further discussion within this Chapter directly compares results between both studies. Comparisons between the current research and De Jonge et al (2001) examining relationships between stress and well-being factors revealed similarities. Both studies support a food fitting one-way model represented by Model A. Both studies least favours a reverse model represented by Model B. The present findings support a good fitting reciprocal model represented by Model C whereas De Jonge et al (2001) only partially supports such a model. Both studies best fitting models produced evidence of cross-validity. Further discussion of results show that Models within the current research produced stronger causal pathways to that of similar models produced by De Jonge and colleagues (2001) in their work. Similarly, for both studies it was discovered that generally negative affectivity had no influence upon best fitting models. The discussion then finishes by outlining further similarities and differences between this and De Jonge et al's (2001) research.

CHAPTER FOURTEEN: EVALUATION OF RESEARCH HYPOTHESIS TWO – STRESS, WELL-BEING & CONTROL

14.1 Overview of Chapter Fourteen

Chapter Fourteen begins by summarising the findings produced within SECTION C (Chapter Twelve, section 12.3) in regards to the association between stress, well-being and control (H2). The chapter begins with a summary of the results produced from this study. The following section discusses the current research findings in relation to other similar research published over the years. Within section 14.3.1, Karasek's (1979) Job Demand-Control (JDC) model and Pearlin & Schooler's (1978) model are discussed. Similarly to the previous chapters within SECTION D (DISCUSSION), the following then discusses the intricate relationships between stress, well-being and control across life domains found within the current study including one-way, reverse and reciprocal causation. A summary of Chapter Fourteen then concludes.

14.2 Summary of Results within the Current Research: Hypothesis Two

Structural equation modeling analysis was again conducted within Chapter Twelve to reveal this time whether a reciprocal relationship exists between stress, well-being and control in the workplace, non-work and context-free domains.

Section 12.4.1 initially puts forward a hypothesised theoretical SEM model related with H2. Work and non-work control measures provided excellent fit indice statistics for the two measurement models via confirmatory factor analysis. Longitudinal SEM path model analysis showed that Model C produced good fit (a reciprocal cross-lagged model with both one-way and reverse structural paths from T1 stress and control measures to T2 stress and control measures). See Figure 3.10. However, Model C1 overall exhibited an unacceptable fit (a reciprocal cross-lagged model with both one-way and reverse structural paths from T1 well-being and control measures to T2 well-being and control measures). See Figure 3.11. Model C was significantly the best fitting model of the two. Multi-group analysis also showed that the eight causal pathways within final Model C were invariant across both groups of data. However, the multi-group analysis performed on the final model reflecting H2 exhibited poor fit indice values across the two groups of data.

14.3 Evaluation of Results within the Current Research: Hypothesis Two

Section 14.3.1 shall explore the results from the present research in regards to H2 (relationship between stress, well-being and control). Best fitting Model C from section 12.4 reflected within Chapter Twelve shall be mainly referred to throughout this section. Generally, discussion will examine the results from the current study alongside similar research previously performed in relation to H2 (refer mainly to Chapter Two and Chapter Five).

14.3.1 Previous Research: Consistencies, Contributions & Revisions

The following section discusses the role that control plays within the stress/well-being process in relation to the present studies H2 and Chapter Two. However, since there is no specific model of control within the literature, the focus is more upon the construct of personal mastery in relation to control as this is the measure used within the current study (Pearlin & Schooler, 1978).

Firstly, previous research seems to indicate that there is a significant relationship between personal control within the workplace and the stress/well-being process (Spector, 1982, 1986). More specifically, Karasek's (1979) Job Demand-Control (JDC) model suggests that high job demands (work stressors) and low job control influence low levels of psychological well-being. This model can to some extent be tested using data from the current research. The current research does not always estimate one particular single simultaneous model. For instance, within the present case to investigate a model in which the effects of stress influence well-being and the effects of control influence well-being simultaneously. However, evidence can be drawn together as discussed before from separate individual models in relation to particular hypothesis to help examine the JDC model (in this instance in regards to H1 and H2). For example, the longitudinal cross-lagged causal pattern that stress (T1) influences well-being (T2) was supported within Chapter Twelve by two good fitting models reflected by Model A and A1 (see section 12.2.3.1 and 12.2.3.4 respectively). These two models associated with H1 were discussed in detail within Chapter Thirteen. However, the reciprocal longitudinal cross-lagged causal pattern that work-related control (T1) influences work-related well-being (T2) was not supported within Chapter Twelve by not overall acceptable fitting Model C1 (see section 12.3.3.2). Model A and A1 in relation to H1 as well as the supporting Model C1 in relation to H together form evidence to partially reject the claim by Karasek (1979) that negative well-being is the results of both high job demand and low job control.

Research conducted by Rick et al (2002) has discovered evidence that control has no influence upon health outcomes similar to results produced within the current study shown by Model C1 reflecting H2 as discussed above. Nevertheless, it should be noted that Model C1 representing the relationship between control and well-being was overall approaching fit and that the causal path from workplace control to workplace mental health was strong with a regression coefficient of .59 (see Table 3.19).

Pearlin & Schooler's (1978) model can also be indirectly investigated via the examination of models estimated within the current analysis. For example, the authors consider in their theory that when an individual upholds high levels of perceived control they are less likely to experience distressing circumstances by influencing the stressor. Thus, it would appear reasonable and appropriate within the present study to explore Model C in relation to H2 (see 12.3.3.1, within Chapter Twelve) which estimates the causal relationship between stress and control. It can be seen that Model C is a good fitting model (see Figure 3.10). This model reflects a reciprocal cross-lagged model with both one-way and reverse structural paths from T1 stress and control measures to T2 the same stress and control measures. In other words the current research reveals there to be a negative relationship between stress and control in that low levels of stress experienced predict greater levels of control and vice versa. It would then seem that the current research is consistent with the ideas generally put forward by Pearlin & Schooler (1978).

The direct relationship between mastery and well-being has been researched by numerous authors over the years. For example Folkman et al (1986a, 1986b) found that perceived sense of mastery was associated with greater context-free well-being. Although the current study estimating the reciprocal relationship between mastery and well-being overall produced an unacceptable fit to the data (Model C1), the specific causal pathway between both work/non-work control and context-free well-being were both strong thus showing the influence of outside of work sense of control upon non-work and context-free psychological well-being (see Table 3.19). This finding is therefore to an extent consistent with that of Folkman et al (1986a, 1986b). Within the same vein, the current research results in regards to H2 are also consistent with research performed by Franks & Faux (1990) and Guppy & Weatherstone (1997) who discovered that mastery at work was associated with well-being at work. For example, it was found within Model C1 that the two-way reciprocal causal association between domain-specific workplace control and workplace well-being produced strong regression weights although as previously mentioned overall model fit was not good. This expands upon previous research by estimating two-way causality between both variables as opposed to only one-way.

The discussion so far within this section (14.3.1) that makes comparisons between the present studies findings and other similar studies performed by other authors in relation to the association between stress, well-being and control has referred to previous work that is cross-sectional in design, whereas the current research is longitudinal.

It has been acknowledged within the literature that longitudinal studies investigating the influence of control within occupational stress research are limited. This has consequently restricted the production of causal evidence between variables such as stress, control and well-being associated with H2 within the current chapter. For instance, of only 19 longitudinal studies conducted examining Karasek's model that were of acceptable methodological quality, only modest support was produced for the model. However, the present research utilises longitudinal design and incorporates SEM techniques in an attempt to examine further complex causal inferences between occupational stress, perceived control and psychological outcome measures by testing one-way, reverse and reciprocal relationships between variables. James & Tetrick (1986), Steptoe & Appels (1989) and De Lange et al (2003) also support the idea of incorporating longitudinal design, using SEM and testing complex relationships between variables within this type of research in order to expand the understanding of the field. Thus, the following shall now discuss previous research within the literature that is longitudinal in design in order to directly compare results from this study.

Studies that do examine these causal associations over time indicate that workplace well-being effects workplace control (Daniels & Guppy, 1997). This one-way causal pathway shown in Model C1 in relation to H2 within the current research was mentioned earlier (also see section 12.3.3.2, Figure 3.11 and Table 3.19). The positive regression coefficient for this relationship was strong at .77 therefore supporting Daniels & Guppy's (1997) study and the theory that greater workplace well-being predicts a greater sense of workplace control.

Moreover, there appears to be no previous research that has simultaneously measured the complex causal interrelationships (one-way, reverse and reciprocal associations) between perceived mastery, stress and well-being across work, non-work and context-free domains longitudinally using SEM analysis. However, the present study does estimate these relationships in order to explore what paths between variables are dominant. Good fitting Model C that estimates the reciprocal relationship between stress and mastery shall now be further examined to inspect causal paths of interest that have so far not been discussed within the present section 14.3.1 (see Figure 3.10).

Earlier within this section it was discussed how reciprocal model Model C overall supported Pearlin & Schooler's (1978) theory. However, examination of specific causal paths within the model will now be investigated. A closer look shows that the strongest causal pathways are both one-way and domain-specific from stress to control. For example, low levels of workplace stress are indicators of perceived control in individuals at work. Also, low levels of stress experienced outside the workplace are indicators of perceived control in individuals outside of work. These findings from an overall good fitting model reveal that the experience of stress within and outside work predicts a persons perceived level of control within and outside work respectively.

The again domain-specific (but this time reverse causal effects) of workplace control upon workplace stress as well as non-work control upon non-work stress also has a reasonably strong effect within Model C. These causal pathways suggest that greater levels of control experienced effect low levels of stress within work and non-work contexts. Other non-domain specific causal associations of interest within Model C are the one-way effects of non-work stress upon work-related control and the reverse effects of non-work control upon work-related stress. This result suggests that the effects of non-work stress and control can have a reasonably strong effect upon across non-domain specific work-related control and stress.

Best fitting cross-lagged Model C representing a reciprocal model with both one-way and reverse structural paths from T1 stress and control measures to T2 stress and control measures across work and non-work contexts was also tested for cross-validation via SEM multi-group analysis. Results from the analysis show that all the causal pathways between the stress and control mechanisms are invariant and therefore stable. However, it should further be noted that that the invariant Model C did not overall produce good fit across both the working/non-working students and trainee nurses pooled data and the university staff sample simultaneously (see Table 3.21).

The results derived from Chapter Twelve within the current study measuring the association between stress, well-being and control to address H2 contributes to and expands previous empirical knowledge within this area of occupational stress research. It does so by introducing longitudinal design and incorporating SEM in order to test complex associations between variables and across life domains as discussed above. The analysis also examines measurement models used for causal exploration.

The analysis performed within section 12.3 partially supports H2. For example, the measurement models have excellent factor structures. Also, the longitudinal cross-lagged reciprocal path model examining the relationship between the stress and control variables exhibited good fit (Model C). However, accompanying longitudinal cross-lagged reciprocal path model investigating the association between the well-being and control variables did not exhibit overall good fit (Model C1). The multi-group analysis associated with Final Model C estimated across groups also somewhat support H2.

14.4 Summary of Chapter Fourteen

Chapter Fourteen presents a discussion of the structural equation modeling (SEM) findings that were conducted within the current study in relation to H2 within Chapter Twelve (section 12.3). The hypothesis states that:

There is a reciprocal relationship between stress, control and well-being in the workplace, non-work and context-free domains of life.

Stress influences control as well as control influences stress. Control influences well-being as well as well-being influences control. The reciprocal relationship amongst the three variables will be consistent across the three domains of life as depicted in Figure 1.10, Figure 3.9 and Figure 3.9a.

A summary of the major results extracted from the present research was firstly described which indicated that reciprocal cross-lagged Model C representing stress and control was overall the best fitting model. This was followed by section 14.3 that examines the results from the current research to that of previous research and models in regards to H2.

Thus, Karasek's (1979) Job Demand-Control (JDC) model was firstly discussed which suggests that high job demands and low job control influence low levels of well-being. Evidence within the current study from Model A and A1 from H1 as well as Model C1 from H3 together revealed only partial support for Karasek's (1979) model. However, research conducted within the current study has discovered evidence that control has no influence upon health outcomes reflected by Model C1, similar to results produced by Rick et al (2002). It also seems apparent that findings within this research are consistent with Pearlin & Schooler's (1978) model of mastery in that both studies indicate that there is a negative association between stress and control.

The present study further found that perceived sense of mastery was related with greater context-free well-being. This result is consistent with evidence produced by Folkman et al (1986a, 1986b). The results also revealed that the reciprocal causal relationship between domain-specific workplace control and workplace well-being was strong within Model C1 although the overall model fit was not good.

Further into section 14.3.1 within the current Chapter, the focus is then more upon discussing previous research that incorporate longitudinal design and SEM techniques like that of the present study in order to compare findings. Evidence was found to support Daniels & Guppy's (1997) longitudinal research that greater work-related well-being predicts a greater sense of work-related control.

A closer look at specific causal associations within good fitting Model C reveal that the strongest pathways are from workplace stress to perceived control at work as well as non-work stress to perceived control outside of work (both causal paths being one-way in direction). Other associations of interest are also discussed within section 14.3.1 including strong reverse causal patterns. Discussion also noted that best fitting reciprocal Model C was invariant across two groups of data for all eight causal paths estimated

CHAPTER FIFTEEN: EVALUATION OF RESEARCH HYPOTHESIS THREE – STRESS, WELL-BEING & WORK PERFORMANCE

15.1 Overview of Chapter Fifteen

Chapter Fifteen initially summarises the results produced within SECTION C: RESULTS (Chapter Twelve, section 12.4) in relation to H3 which examines the causal relationship between stress, well-being and work performance. This is followed by a discussion of the current research findings in comparison to other similar previous research conducted. Discussions begin by evaluating the present research results to that of previous cross-sectional studies then followed by longitudinal studies. Work conducted by Jex (1998) is evaluated as well as discussion regards the causal relationship between variables associated with H4. Within the literature, evidence to support Model C and Model C1 are explored (see Chapter Twelve, sections 12.4.3.1 and 12.4.3.2 respectively). Chapter Twelve then outlined how the current study expands and contributes to previous knowledge towards the understanding of the relationship between stress, well-being and work performance. A summary then concludes the chapter.

15.2 Summary of Results within the Current Research: Hypothesis Three

Structural equation modeling analysis was finally performed within Chapter Twelve to explore whether a reciprocal association exists between stress, well-being and work performance measured across work and non-work domains.

In relation to H3, within section 12.4.2 a single work performance measurement model to be incorporated into the forthcoming path analysis was estimated via confirmatory factor analysis and exhibited excellent fit. Following this, longitudinal SEM path model analysis showed that Model C produced good fit (a reciprocal cross-lagged model with both one-way and reverse structural paths from T1 stress and work performance to T2 stress and work performance). See Figure 3.13. However, accompanying Model C1 exhibited a poor fit to the data (a reciprocal cross-lagged model with both one-way and reverse structural paths from T1 well-being and work performance to T2 well-being and work performance). See Figure 3.14. Model C was significantly the best fitting model of the two. Findings from multi-group analysis suggest that all four causal paths within final Model C are invariant across both groups of data. Similarly to H2 however, the multi-group analysis conducted on the final model C reflecting H3 generally produced poor fit statistics across the two groups.

15.3 Evaluation of Results within the Current Research: Hypothesis Four

In regards to H3, section 15.3.1 will investigate the results from the current research (relationship between stress, well-being and work performance). Throughout this section, discussion will compare the results from the present study to that of other similar performed research (refer mainly to Chapter Four and Chapter Five). Initially, comparisons with previously conducted cross-sectional studies shall be discussed followed by an evaluation of longitudinal studies.

15.3.1 Previous Research: Consistencies, Contributions & Revisions

Within Chapter Four it was mentioned that interpersonal conflict at work (work-related stress) and work performance are not strongly related to one another (Jex, 1998). However, the current good fitting Model C reflecting H3 rejects this argument which suggests that there is a very strong reciprocal association between the two variables (see Figure 3.13). It has also been reported that greater well-being influences greater work performance (Hosie, 2003). Again, the current research appears to reject this idea based upon the findings from overall not good fitting Model C1 which represents a reciprocal model from T1 outcome measures (work and non-work well-being) and work performance measures to T2 outcome measures (work and non-work well-being) and work performance measures (see Figure 3.14). The current studies results seem consistent with other authors who also found no real relationship between outcomes and work performance (Vroom, 1964, Locke, 1976 and Iaffaldano & Muchinsky, 1985), some of whom have incorporated samples that are consistent with the present study (Steen et al, 1998). Nonetheless, specific causal patterns within Model C1 indicate particularly strong relationships between constructs. For example, especially the one-way causal path from work-related well-being to work performance which produced a strong negative regression coefficient of -.99 (see Table 3.24) thus somewhat supporting Hosie's (2003) findings.

More interestingly and directly relevant to measures used within the current studies analysis, Jex (1998) also found that workload stress is related to work performance both positively and negatively. This finding is consistent with what's been found within

Model C. For example, the overall good fitting model simultaneously shows that stress and performance effect one another both positively (i.e. low levels of non-work stress influence low perceived work performance) and positively (i.e. low levels of work-related stress influence greater work performance and reverse where greater work performance influences low levels of both work/non-work stress). It should be observed however that the two one-way causal paths from sources of stress to work performance are much stronger than the two reverse causal paths from work performance to sources of stress (see Table 3.23 and note that high work performance scores reflect low performance). This finding suggests that less stressors experienced can act to influence a person's greater perceived performance at work. Alternatively, the results also indicate that higher levels of stress experienced can influence greater levels of performance at work. This idea supports both research by Jex (1998) and the current studies reciprocal cross-lagged good fitting Model C in regards to H3.

So far within the current discussion we have focused upon previous research that has been conducted which incorporates cross-sectional design, however we shall now look at similar longitudinal designed research in relation to the present study to address issues concerning H3. Evidence appears to suggest on the whole that longitudinal studies reveal different findings in regards to the relationship between well-being and work performance to that of cross-sectional studies mentioned earlier within the present section. For example, authors such as Wright et al (1993), Staw et al (1994), Wright & Bonett (1997), and Wright & Staw (1999) all claim from their methodologically more stringent longitudinal research that there is a significant positive relationship between well-being and work performance as opposed to Vroom (1964), Locke (1976) Iaffaldano & Muchinsky (1985) and Steen et al (1998) who consider there is no association. As mentioned earlier in relation to cross-sectional research, the current study does not support the suggestion that there is a significant relationship between well-being and work performance due to the overall non good fitting Model C1. However, it was also discussed earlier that there was a strong causal path within Model C1 showing that high levels of work-related well-being effect high levels of work performance. This was also found reciprocally where high levels of work performance effect high levels of work-related well-being (see Table 3.24).

The current research findings are inconsistent with a study conducted by Van Dyne et al (2002). For example, the authors found a positive relationship between work-related stress and work performance and a negative relationship between non-work stress and work performance.

The results produced by the current research in regards to the causal association between stress and work performance (best fitting Model C) was also tested for invariance to further support findings. It was found that all four reciprocal causal paths between variables were stable across the two groups of data. However, the overall model fit was not good (see section 12.4.4 within Chapter Twelve).

Overall, it should be noted that the present studies results further expands upon the limited previous research measuring the relationship between stress, well-being and work performance. For instance, the current research incorporates longitudinal design, sophisticated SEM analysis techniques and multi-group analysis in an attempt to strengthen findings both methodologically and statistically. Research has never before used the above methods to specifically test the causal associations between these variables, and so in doing has produced interesting and meaningful results which contribute to the understanding of occupational health psychology by exploring the intricate causal relationship between stress, well-being and work performance.

Results found within section 12.4 partially support H3. For example, the single measurement model exhibited an excellent factor structure. The longitudinal cross-lagged reciprocal path model examining the relationship between stress and work performance also exhibited excellent fit (Model C). Nevertheless, the longitudinal cross-lagged reciprocal path model testing the relationship between well-being and work performance produced an overall poor fit (Model C1). The final piece of investigation examined via multi-group analysis of Final Model C also somewhat supported H3. It can be observed that the discussion of results produced within the current Chapter Fifteen in relation to H3 are similar to those produced within Chapter Fourteen in relation to H2. For example, both produced excellent measurement models, good to excellent longitudinal reciprocal path models incorporating stress variables (Models C), not well-being (Models C1) as well as semi-supportive multi-group analysis for best fitting model with invariant causal pathways.

15.4 Summary of Chapter Fifteen

A discussion of the structural equation modeling (SEM) results that were performed within the current research in relation to H3 within Chapter Twelve (section 12.4) were presented within Chapter Fifteen. The hypothesis put forward states that:

There is a reciprocal relationship between stress, well-being and work performance in the workplace, non-work and context-free domains of life where appropriate.

Stress influences work performance as well as work performance influences stress. Work performance influences well-being as well as well-being influences work performance. The reciprocal relationship amongst the three variables will be consistent across the domains of life as shown in Figure 1.10, Figure 3.12 and Figure 3.12a.

Within initial section 15.2, a summary of findings produced from the current research was outlined. The findings reveal that longitudinal reciprocal cross-lagged Model C reflecting stress and work performance was overall the best fitting model. Section 15.3 then compares the results from the present study with previous research in relation to H3.

The discussion that follows firstly takes a look at cross-sectional studies. Findings indicate that the current study supports a good fitting cross-lagged reciprocal causal model between stress and work performance (see Figure 3.13). Model C1 which reflects the reciprocal relationship between this time well-being and work performance was found to be non good fitting overall and consistent with most of the previous research examining this relationship (e.g. Vroom, 1964, Locke, 1976, Iaffaldano & Muchinsky, 1985 and Steen et al, 1998). Nonetheless, Model C1 produced particularly strong two-way causal pathways within the model between workplace mental health and work performance (see Table 3.14).

Further findings from the current research (Model C) go onto provide statistical evidence to support Jex (1998) who suggests that stress is related to work performance both positively and negatively. For example within the current study, low levels of workplace stress influence high work performance, and reverse, greater work performance effects low levels of work and non-work stress (negative association). Also, low levels of non-work stress influence low work performance (positive association).

Section 15.3 then discusses the current studies results in relation to previous longitudinal research that examine the relationships between variables within H3. The present research reveals that it is not consistent with previous studies that suggest there is significant association between well-being and work performance. Further discussion within section 15.3 found a negative association between work-related stress and work performance and a positive relationship between non-work stress and work performance, inconsistent with findings from Van Dyne et al (2002) in their study.

Discussion then puts forward how the current study contributes to previous research in this area by implementing a rigid methodology to enable complex causal analysis amongst variables within H3.

Evaluation of H3 is finally discussed in relation to the results produced within the RESULTS section (Chapter Twelve). It was found that the results somewhat support the hypothesis. For example, overall Model C supports H3, whereas Model C1 overall does not.

CHAPTER SIXTEEN: DISCUSSION OF METHODOLOGICAL ISSUES

16.1 Overview of Chapter Sixteen

Within Chapter Sixteen, an examination of the methodology used in this study is discussed. Discussions relate to all SECTIONS throughout the thesis, however in particular to SECTION C: RESULTS, which encompasses longitudinal, multi-sample data analysis using structural equation modeling (SEM). Also see Chapter Five (section 5.5: Methodology). Section 16.2 discusses issues concerning longitudinal design, section 16.3 looks at SEM analysis and section 16.4 briefly outlines issues concerning multi-sample SEM approaches. All sections within the following chapter discuss the advantages of using these particular methods, problems associated with them and compare other previous research that has incorporated the same methodology to that of the present one. The Chapter finishes with a summary of its contents.

16.2 Longitudinal Design

The current study incorporates longitudinal methodology, a design recommended by numerous authors when conducting stress research (Lazarus, 1981, Parkes et al, 1994 Colvin et al, 1995, Hart et al, 1995 and Zapf et al, 1996). Within Chapter Five (section 5.5.1) the many advantages of using this design within stress/well-being research were put forward. It was acknowledged that only 43 studies researching organizational stress were conducted up until 1996 (Zapf et al, 1996). The present study upholds the seven recommendations put forward by Zapf et al (1996) in regards to conducting longitudinal research. For example, the same variables are measured at all time points across all groups, negative affectivity is controlled for as a third variable, the time lags are planned before data collection, consideration for the time of the study was explored (but not considered of major importance), structural equation modeling is used as the analytic technique, measurement models are tested via confirmatory factor analysis and competing models are tested for one-way, reverse and reciprocal relationships. Thus, one can be more assured and confident that the results produced from the current research are meaningful due to the robust methodology utilised as opposed to studies that fail to incorporate such methods.

However, it is recognised that there are further potential problems to be addressed when conducting longitudinal research. For example, Warr (1987) put forward the idea that association between the same particular measure may be inflated through participants completing longitudinal self-report questionnaires too quickly. Warr (1987) suggests that contamination can occur through consistent responding and recommends that studies that measure the same concept across different life context (for instance within the present study, work, non-work and context-free well-being) should incorporate both quantitative questionnaires and qualitative interviews to avoid this contamination. The current study does address this issue somewhat in that the questionnaires that were distributed for all three groups had time lags of between two and four months which is not a too short time gap between responses. However, perhaps the current study could have incorporated qualitative interviews alongside the questionnaire distribution in order to enrich findings and avoid contamination as mentioned above. Nonetheless, time restrictions would have had to be addressed since this study uses multi-sample and longitudinal design.

It should also be noted that by incorporating longitudinal design within the present study, problems associated with the use of self-report measures can be addressed. For example, although still problematic within longitudinal research, the issue of whether a respondent understands the meaning of a particular word or term the same as the next respondent is combated somewhat by responding to questions over time (i.e. conceptual problems).

However, there still remains outstanding problems associated with longitudinal designed studies such as drop-out rates between time lags. Although the current study attempted to accommodate the problems associated with participants failing to complete questionnaires more than once after baseline by collecting large sample sizes at time one, nevertheless drop-out was considerable over time phases (see Chapter Seven). For example, data collected from the university staff sample at time point three was not used for analysis within the current study, as the sample size was too small for the results to be statistically meaningful. Although drop-out rates were high from baseline to time point two (as well as time point three for the university staff sample), evidence from t-tests conducted within Chapter eleven (section 11.4) showed no indication of attrition bias since there was no significant difference between responders and non-responders. Thus, this attrition analysis suggests that responders and non-responders did not have any great influence upon the findings.

To sum up section 16.2 and in relation to the aims of the current research, Williams & Podsakoff (1989) quote: "Thus, longitudinal studies appear to be ideally suited for examining the reciprocal relationships between employee attitudes and employee behaviors, leader and subordinate behaviors, and other related organizational phenomena."

16.3 Structural Equation Modeling Statistical Analysis

The present study also incorporates structural equation modeling (SEM) statistical techniques to analyse data, again an approach recommended by Zapf et al (1996) as well as other more recent authors (Lange et al, 2003). The many advantages of using SEM in occupational stress related research was discussed within Chapter Five (section 5.5.2). For example in brief, SEM allows initial measurement model analysis, theoretical hypothesis examination, calculation of error variance, it allows complex associations between variables to be tested and estimates third variable problems.

However, since SEM analysis can be complicated, a number of analytic procedures that were incorporated within the current analysis need addressing.

Firstly, and as mentioned within Chapter Twelve (section 12.2.3), for each hypothesis there were a sequence of smaller models estimated, similar to De Jonge et al's (2001) study, that reflect specific causal patterns within models (as opposed to single large models which require huge sample sizes in order to be estimated, especially if longitudinal). The problem here is that models fail to estimate the mediating processes of particular concepts (e.g. control) and their potential alternative role within the stress/well-being process. However, what is investigated in great depth is the intricate longitudinal cross-lagged one-way, reverse and reciprocal relationship between variables related to a specific hypothesis within the current study across different life domains. The analytic procedure used within the present study has been supported by other leading authors in the field (Dormann & Zapf, 2002).

Secondly, within the reciprocal models associated with particular hypothesis (H1), full models were not estimated that incorporated all variables across all domains. For example, within Models C and C1 reflecting H1 (see Figures 3.4 and 3.7 respectively) non-work and context-free variables at time one are excluded from the models due to identification/estimation problems most probably associated with sample size. Ideally all the above mentioned models would include the excluded outside of work variables within the models at T1 to represent more thorough models. However, reciprocal Models C and C1 reflecting H2 (see Figures 3.10 and 3.11 respectively) and Models representing H3 (see Figures 3.13 and 3.14) do estimate full models including non-work and context-free parameters at T1.

Thirdly, it should be further noted that in an attempt to make the longitudinal models less complicated, each particular subscale representing a particular group of observed items within an overall measure were scored to reflect a single condensed observed factor representing the associated subscale(s). The exact procedure undertaken with examples was discussed within Chapter Twelve (sections 12.2.2 and section 12.2.3). Williams & Podsakoff (1989) support this SEM analytic procedure and note the difficulty of dealing with complex longitudinal models that contain a high number of observed and latent variables.

Nevertheless, it would perhaps seem apparent that by incorporating this technique that information regarding particular individual scales is consequently lost via measurement error. An example of this can be seen in relation to the two individual stress measures used within the present study that have been scored into one scale reflecting general work-related stress (workload and interpersonal conflict). Measurement error would be more apparent where there are a greater number of subscales scored into one overall measure. However, Williams & Podsakoff (1989) suggest that using these SEM scoring techniques like within the present study require the measurement models to be good fitting beforehand. This was conducted within the current research in which second-order confirmatory factor analysis was conducted on scales where necessary in order to complement this type of scored data. Thus, in order to keep models less complex and more straightforward for analysis, multiple subscale measures are represented by one overall global latent variable that reflects the whole structure.

Fourthly, within most of the analysis conducted within Chapter Twelve, models were either good fitting or not. Limited modifications only were attempted to the models if not good fitting initially. This was due to the recommendations by authors such as Dormann & Zapf (2002) and Arbuckle (1999) who state that models should not undergo modifications if there is no theoretical justification for doing so. An alternative reason why limited model modifications were performed within the current study was due to word count restrictions. However, where particular models were approaching fit throughout the SEM causal analysis within Chapter Twelve, perhaps further modifications could have been performed in an attempt to acquire better fit.

The SEM procedure undertaken within this research was very similar to De Jonge and colleagues (2001) as mentioned in various different sections earlier within SECTION D (DISCUSSION). For example, both studies examined the stress and well-being causal relationship longitudinally using cross-lagged SEM analysis. However, and as mentioned throughout other sections within SECTION D, there are differences between the two studies. For instance, in relation directly to SEM within the current section (16.3), De Jonge et al (2001) did not examine measurement models of the scales they used before estimating causal models, an important prerequisite within SEM analysis. Thus, the causal models produced within the analysis for the study may have used inadequate measurement models. However, the current study underwent an intensive psychometric analysis of all the measures used before conducting SEM causal model estimation including questionnaire design incorporating a pilot study, reliability analysis on numerous data sets, item analysis (see Chapter Eight: Questionnaire Measures) and confirmatory factor analysis (Chapter Twelve: Structural Equation Modeling Analysis). All the psychometric analysis performed within Chapter Eight was also tested across two samples of data (university staff and working/non-working students and trainee nurses groups). Thus, one can be more assured within the current study that both the measurement models and the structural equation causal models that follow have undergone extensive statistical analysis.

The current study also uses cross-lagged analytic approaches to conduct the SEM analysis, which is a particularly suitable statistical technique supported by many authors including De Jonge et al (2001). See section 5.5.2.1 within Chapter Five for further discussion.

16.4 Multi-Sample Design

In order to further strengthen findings within the current research, multi-group analysis again using SEM techniques was also performed to cross-validate results across two samples of data. As stated within Chapter Five (section 5.5.3) as well as supported by Steiger (1990) and Vandenberg & Lance (2000), this is a rarely conducted measure of invariance technique within occupational stress research.

De Jonge et al (2001) also conducted multi-group analysis on their models in order to cross-validate findings. However, the multi-group analysis was performed by simply splitting the small sample of data used within the study into two sub-samples. The current research differs in that it incorporates two separate groups of data to conduct the cross-validation procedure, an approach preferable to that of De Jonge et al (2001) as it enables the results to be more generalised to other occupations.

16.5 Summary of Chapter Sixteen

Chapter Sixteen provides a discussion of the methodology implemented within the present study.

Section 16.2 outlines the rationale for incorporating longitudinal design within the current research. Advantages of using such a design are established mainly based upon the recommendations by Zapf et al (1996). This is followed by a discussion that outlines common problems associated with longitudinal research and how the present study addresses them. For example, issues concerning contamination through consistent self-report responding and drop-out rates between data collection time points.

Similarly, section 16.3 puts forward the advantages of using structural equation modeling (SEM) statistical techniques when analysing organizational stress related survey data like within the current study. A run-down of the various SEM approaches used within this study was then discussed and clarified. For example, justification was given for using a particular series of SEM models very similar to that of De Jonge et al (2001) and for estimating particular models with reduced parameters. Also, the justification for scoring variables in a certain way in order to deal with large and complex longitudinal data was put forward and why model modifications were kept to a minimum. The similarities and differences between the current research and De Jonge et al's (2001) study were discussed.

A brief comment on the advantages and rationale for using multi-sample SEM approaches was then discussed as well as a comparison of the technique used between the current study and De Jonge et al's (2001) study (section 16.4).

CHAPTER SEVENTEEN: CONCLUSION

The objective of the current research was to expand upon the current state of knowledge relating to the causal relationship between stress, well-being, control and work performance across work, non-work and context-free life domains. The research explores three main hypotheses in order to investigate associations. The study incorporates longitudinal design, collects data from three samples and uses structural equation modeling (SEM) to conduct the statistical analysis. The current study builds upon previous research conducted, in particular De Jonge et al (2001) and Zapf et al (1996).

The first research question was to examine the causal relationship between stress and well-being. Findings support reciprocal cross-lagged Model C as the best fitting model where both two-way causal paths from T1 sources of stress (work-related stress) and well-being (work-related mental health) simultaneously influence both T2 sources of stress (work and non-work related stress) and well-being (work, non-work and context-free well-being). It was found consistently across all six models representing H1 that the strongest causal relationship overall was between both work-related and non-work stress and context-free well-being thus indicating that outside of work psychological well-being also has a strong reverse effect upon stress. Results produced within the present study were similar to a previous study conducted by De Jonge et al (2001) who incorporated similar variables and methods within their research. However, overall the current results from this study differ most in that a reciprocal model is best fitting as opposed to a one-way causal model where occupational stress influences psychological well-being.

Generally the results from the current study provide evidence to support the strong effects of outside of work factors within occupational stress research. The results from the current research expand upon previous research by estimating reciprocal associations between stress and well-being across different domains, an idea put forward by Warr (1987).

The second research question was to investigate the relationship between stress, well-being and perceived control. Best fitting model was reciprocal cross-lagged Model C in which stress and control simultaneously influence one another which provided partial support for Karasek's (1979) model. The results indicate a negative association between variables. For example, low levels of stress are related to high perceived control across domains. Model C also was invariant across two groups of data. Similarly however, accompanying reciprocal cross-lagged Model C1 where both well-being and control are simultaneously estimated did not exhibit good fit.

The final research question was to determine the causal relationship between stress, well-being and this time work performance. Model C that incorporates stress was again the best fitting model. This model reflects a reciprocal cross-lagged model where work and non-work stress influence work performance and vice versa where work performance influences work and non-work stress. The model shows that low levels of stress influence greater work performance and that greater work performance influences low stress levels experienced. Such findings indicate that stress levels can act as a source of influence upon performance within the workplace and vice versa. However, reciprocal cross-lagged Model C1 did not produce good fit to the data. This model estimates the two-way association between work and non-work well-being and work performance. Findings therefore suggest that generally there is no causal influence between well-being and work performance.

Theoretically, the current research expands upon other previous studies that have measured the associations between the above mentioned variables; stress, well-being, control and work performance (in particular De Jonge et al, 2001). See SECTION A: INTRODUCTION/LITERATURE REVIEW. For example, the present study measures all variables across multiple domains and estimates one-way, reverse and reciprocal causal structures. Overall, conclusions that can be drawn from the present research (and across all four hypotheses) are that evidence indicates that outside of work factors play a big part in occupational health research. Based upon the current studies results, it is suggested that organizational stress/well-being models should not solely be designed without considering the strong influence of non-work effects. This idea generally build upon work conducted by Warr (1987).

Methodologically, the current study also further expands on previous research by overcoming problems associated with stress/well-being research. For example, and recommended by Zapf et al (1996) in relation to longitudinal research, the current investigation incorporates the same variables over time, incorporates third variables, time lags and the time the study is implemented are considered, structural equation modeling (SEM) is used as well as measurement model analysis and one-way, reverse and reciprocal associations between variables are estimated. This study also goes one step further in an attempt to strengthen findings by introducing multi-group analytic approaches to cross-validate results. The SEM analysis performed is also unique in that it has never been conducted previously within one single study by any leading authors in the field of occupational stress research. For example, the current study undertakes an in-depth, thorough and exhaustive SEM analysis in an attempt to address particular hypothesis i.e. estimation is conducted on measurement models and longitudinal cross-lagged causal models. Model comparisons are then also estimated as well as multi-group invariance analysis. Thus, the current research has addressed the main methodological and statistical issues of concern that are apparent when conducting occupational health research.

See SECTION C and D for a more in-depth discussion of the results.

17.1 Future Research & Developments

Through undertaking the current research a number of theoretical and methodological issues have become apparent that should be considered when conducting future research.

Firstly, in order to estimate more complex models using longitudinal data, larger follow-up sample sizes are recommended at time point two onwards. If sample sizes are not large enough, SEM estimation is unlikely depending upon model complexity. The current studies drop-out rates from respondents over time phases were considerable enough to be problematic when conducting the analysis (see Chapter Seven for figures regarding drop-out rates from all three samples of data). Consequently, a sequence of smaller less complex models were estimated.

Secondly, due to the problems associated with self-completion questionnaires within longitudinal survey research, perhaps future research should also incorporate for instance qualitative interviews alongside the self-reports which would provide an accompanying data source to complement the quantitative methods and thus would address contamination of responses issues and enrich/mix data. This idea was touched upon within the previous Chapter 16.2 (Longitudinal Design).

Thirdly, future research conducted within the organizational health field may want to further examine the techniques, procedures and methodology utilised within the present study using alternative groups of employees in order to further cross-validate and generalise findings to other occupations.

Fourthly, and as mentioned within the previous section, future stress models and research should consider the influence of factors outside of work. Models that are designed based upon occupational health research that do not include non-work and context-free variables fail to encompass the wide range of factors that contribute to the whole field of study. It would appear that by considering these non-work factors related to stress, well-being, coping and control that research would further contribute to and have practical implications for work/life balance policy and stress management programmes.

In conclusion, there have been significant recent developments in the field of organizational stress and well-being from reviews of the impact of work related stressors (Rick et al, 2002) to more detailed investigations of good practice in the measurement of psychosocial hazards (Rick et al, 2001). Alongside these studies there have also been developments in the use of analytical techniques (De Jonge et al, 2001 and Zapf et al, 1996). The current research hopes to contribute to these new perspectives in the future and through such progress may assist in the effective and appropriate management of workplace stress.

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APPENDIX

APPENDIX 2.1

Dear Colleague,

My name is Julian Edwards and I am currently studying for a PhD in Occupational Psychology at Middlesex University. I would be very grateful if you would consider taking part in my research, which is to assess aspects of psychological well-being, and stress in the workplace.

Your co-operation in completing this short questionnaire would be greatly appreciated. Please note that involvement is purely voluntary. Information given shall be treated in the strictest confidence (i.e. coding of respondents and secure storage of data). I would ask that you are also prepared to fill in subsequent questionnaires in a few weeks time so I can explore whether your responses are stable over time.

The results of the study are likely to be of interest to academics, administrative, clerical and technical staff.

Thank you for your time and effort with this research.

Julian Edwards
Middlesex University
School of Social Science
Psychology
Queensway
Enfield EN3 4SF

Dear Colleague,

Firstly, thank you very much if you agreed to participate in my research over the past month by completing the questionnaire sent to you to assess psychological well-being and stress in the workplace.

As initially stated, subsequent questionnaires would be sent to you in order to explore whether your responses are stable over time. Thus, please complete the same self-report questionnaire again and return to me via internal mail. **Your co-operation in completing this follow up questionnaire would be greatly appreciated.** Please note that information given shall be treated in the strictest confidence.

I would ask that you are also prepared to fill in a final questionnaire at the start of the next academic year (September) in order to continue to explore whether your responses are stable over time.

Julian Edwards
PhD Student
School of Social Science
Psychology
Middlesex University
Queensway
EN3 4SF

Dear Colleague,

Thank you very much if you agreed to participate in my research over the past few months by completing the questionnaires sent to you to assess psychological well-being and stress in the workplace.

As initially stated, a third and final questionnaire would be sent to you in order to explore whether your responses are stable over time. Thus, please complete this final self-report questionnaire again and return to me via internal mail. **Your co-operation in completing this final follow-up questionnaire would be greatly appreciated**. Please note that all information given shall be treated in the strictest confidence.

Julian Edwards
PhD Student
School of Social Science
Psychology
Middlesex University
Queensway
EN3 4SF

APPENDIX 2.2

Dear Student,

My name is Julian Edwards and I am currently studying for a PhD in Occupational Psychology at Middlesex University. I would be very grateful if you would consider taking part in my research, which is to assess aspects of psychological well-being and stress.

Your co-operation in completing this short questionnaire would be greatly appreciated. Please note that involvement is purely voluntary. Information given shall be treated in the strictest confidence (i.e. no names or addresses requested and secure storage of data). I would ask that you are also prepared to fill in a subsequent questionnaire in approximately two months in order for responses to be measured over time.

Thank you for your time and effort with this research.

Julian Edwards
Middlesex University
School of Social Science
Psychology
Queensway
Enfield EN3 4SF

In order to uphold confidentiality, please indicate your:

STUDENT NUMBER: ....

PROGRAMME OF STUDY: ....

Dear Student,

Thank you very much if you agreed to participate in my research over the past few months by completing my questionnaire to assess psychological well-being and stress in Middlesex University students

As initially stated, a second and final questionnaire would be asked to be completed by you in order for responses to be measured over time. **Your co-operation in completing this final follow-up questionnaire would be greatly appreciated**. Please note again that involvement is purely voluntary and all information given shall be treated in the strictest confidence.

Thank you very much for your time and effort with this research.

Julian Edwards
PhD Student
School of Social Science
Psychology
Middlesex University
Queensway
EN3 4SF

In order to uphold confidentiality, please indicate your:

STUDENT NUMBER: ....

PROGRAMME OF STUDY: ....

APPENDIX 2.3

Middlesex University

Thank you for agreeing to participate in this research. Please complete the questionnaire and return to me via internal mail at the address given at the end of the questionnaire.

Please be sure to answer all questions. There are no right or wrong answers. The project is supervised by Professor Andrew Guppy and Dr Tracey Cockerton at Middlesex University (Psychology).

Please sign the following consent to participate.

I agree to take part in the following study, and can withdraw at any time.

Participant signature: ____

SECTION 1: YOUR WORKING LIFE

(a) This section asks you to indicate ***how often*** each item occurs at work.
PLEASE REPLY TO ALL THE ITEMS.

Use these response choices to answer the items below:

1	2	3	4	5
Less than once per month or never	Once or twice per month	Once or twice per week	Once or twice per day	Several times per day

Circle your response choice for each item on the table

Items	Circle Your Choice				
1. How often do you get into arguments with others at work?	1	2	3	4	5
2. How often do other people yell at you at work?	1	2	3	4	5
3. How often are people rude to you at work?	1	2	3	4	5
4. How often do other people do nasty things to you at work?	1	2	3	4	5
5. How often does your job require you to work very fast/	1	2	3	4	5
6. How often does your job require you to work very hard?	1	2	3	4	5
7. How often does your job leave you with little time to get things done?	1	2	3	4	5
8. How often is there a great deal to be done?	1	2	3	4	5
9. How often do you have to do more work than you can do well?	1	2	3	4	5

(b) This part of the questionnaire asks about how you react to stressful events in your ***working life.*** In view of the ***most recent***, personally important stressful event you experienced, indicate on the tables below how this event made you feel.

This event made me feel....

Circle your response choice for each item on the table:

Items	Not At All				A Great Deal
1. That I would appear to be unsuccessful	1	2	3	4	5
2. That I would appear to be incompetent	1	2	3	4	5
3. That I would appear to be an unsupportive person	1	2	3	4	5
4. That I would appear to be difficult to get along with	1	2	3	4	5
5. A sense of hostility from others	1	2	3	4	5

In the past, a personally stressful event could best be described as....

Circle your response choice for each item on the table:

Items	Not At All				A Great Deal
1. One where I needed to hold myself back from doing what I wanted	1	2	3	4	5
2. One where, if I deal with it in the way I wanted, it would have made things difficult for me	1	2	3	4	5

(c) This section asks about the degree of ***control*** or influence you have over your working life.

Circle your response choice for each item on the table:

Items	Strongly Agree	Agree	Disagree	Strongly Disagree
1. I have little control over the things that happen to me at work	1	2	3	4
2. There is little I can do to change many of the important things in life at work	1	2	3	4
3. What happens to me in the future at work mostly depends on me	1	2	3	4

(d) This next section concerns how you ***perceive your work performance*** to be over the ***past three months.***

Circle your response choice for each item on the table:

Items	Noticeably Better	Somewhat Better	About The Same	Somewhat Worse	Noticeably Worse
1. Your overall work performance	1	2	3	4	5
3. Your relationship with your colleagues	1	2	3	4	5
4. Your relationship with your supervisors & managers	1	2	3	4	5

(e) This section asks you to indicate what you do and feel, when you experience ***stressful*** events in your life ***at work***.

Tick your response choice for each item on the table

Items	Never	Rarely	Sometimes	Often	Always
1. I work on changing the situation to get what I want					
2. I try to adjust my expectations to meet the situation					
3. I tell myself the problem isn't such a big deal after all					
4. I try to avoid thinking about the problem					
5. I try to get advice from someone about what to do					
6. I talk to someone about how I feel					
7. I try to change the situation to get what I want					
8. I try to adjust my own standards					
9. I tell myself the problem isn't so serious after all					
10. I try to forget the whole thing					
11. I talk to someone to find out more about the situation					
12. I discuss my feelings with someone					

(f) These questions ask about how things have been going in the ***past few weeks*** in your job.

Circle your response choice for each item on the table

Items	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. I can do my job well	1	2	3	4	5
2. I sometimes think that I am not very competent at my job	1	2	3	4	5
3. I can deal with just about any problem in my job	1	2	3	4	5
4. I find my job quite difficult	1	2	3	4	5
5. I am not interested in my job	1	2	3	4	5
6. I enjoy doing new things in my job	1	2	3	4	5
7. I prefer to avoid difficult activities in my job	1	2	3	4	5
8. In my job I make a special effort to try when thing seem difficult	1	2	3	4	5
9. I feel used up at the end of a work day	1	2	3	4	5
10. My job makes me feel quite exhausted at the end of a work day	1	2	3	4	5

(g) Thinking of the ***past few weeks,*** how much of the time has your job made you feel the following.....?

Circle your response choice for each item on the table:

Items	Never	Occasionally	Some of the time	Much of the time	Most of the time	All of the time
1. Tense	1	2	3	4	5	6
2. Worried	1	2	3	4	5	6
3. Calm	1	2	3	4	5	6
4. Relaxed	1	2	3	4	5	6
5. Gloomy	1	2	3	4	5	6
6. Miserable	1	2	3	4	5	6
7. Enthusiastic	1	2	3	4	5	6
8. Optimistic	1	2	3	4	5	6

SECTION 2: YOUR NON-WORKING LIFE

(a) This section asks you to indicate ***how often*** each item occurs in your ***non-working life***.
PLEASE REPLY TO ALL THE ITEMS.

Use these response choices to answer the items below:

1 Less than once per month or never	2 Once or twice per month	3 Once or twice per week	4 Once or twice per day	5 Several times per day

Circle your response choice for each item on the table

Items	Circle Your Choice				
1. How often are people rude to you in your life outside of work?	1	2	3	4	5
2. How often do other people do nasty things to you outside of work?	1	2	3	4	5
3. How often does your life outside of work leave you with little time to get things done?	1	2	3	4	5
4. How often is there a great deal to be done in your life outside of work?	1	2	3	4	5
5. How often do you have to do more work than you can do well outside of work?	1	2	3	4	5

(b) This part of the questionnaire asks about how you react to stressful events in your ***non-working life.*** In view of the ***most recent***, personally important stressful event you experienced, indicate on the tables below how this event made you feel.

This event made me feel....

Circle your response choice for each item on the table:

Items	Not At All				A Great Deal
1. That I would appear to be unsuccessful	1	2	3	4	5
2. That I would appear to be incompetent	1	2	3	4	5
3. That I would appear to be an unsupportive person	1	2	3	4	5
4. That I would appear to be difficult to get along with	1	2	3	4	5
5. A sense of hostility from others	1	2	3	4	5

In the past, a personally stressful event could best be described as....

Circle your response choice for each item on the table:

Items	Not At All				A Great Deal
1. One where I needed to hold myself back from doing what I wanted	1	2	3	4	5
2. One where, if I deal with it in the way I wanted, it would have made things difficult for me	1	2	3	4	5

(c) This section asks you to indicate what you do and feel, when you experience ***stressful events*** in your life ***outside of work***.

Tick your response choice for each item on the table

Items	Never	Rarely	Sometimes	Often	Always
1. I work on changing the situation to get what I want					
2. I try to adjust my expectations to meet the situation					
3. I tell myself the problem isn't such a big deal after all					
4. I try to avoid thinking about the problem					
5. I try to get advice from someone about what to do					
6. I talk to someone about how I feel					
7. I try to change the situation to get what I want					
8. I try to adjust my own standards					
9. I tell myself the problem isn't so serious after all					
10. I try to forget the whole thing					
11. I talk to someone to find out more about the situation					
12. I discuss my feelings with someone					

(d) This section asks about the degree of ***control*** or influence you have over your ***non-working life.***

Circle your response choice for each item on the table:

Items	Strongly Agree	Agree	Disagree	Strongly Disagree
1. I have little control over the things that happen to me	1	2	3	4
2. There is little I can do to change many of the important things in my life	1	2	3	4
3. There is really no way I can solve some of the problems I have	1	2	3	4

(e) These questions ask about how things have been going in the ***past few weeks*** in your ***non-working life.***

Circle your response choice for each item on the table:

Items	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. Most things I do, I do well	1	2	3	4	5
2. I sometimes think that I am not very competent in my non-working life	1	2	3	4	5
3. I find my life outside of work quite difficult	1	2	3	4	5
4. I often have trouble coping outside of work	1	2	3	4	5
5. I like to set myself challenging targets outside of work	1	2	3	4	5
6. I am not interested in the world around me	1	2	3	4	5
7. I enjoy doing new things outside of work	1	2	3	4	5
8. I prefer to avoid difficult activities outside of work	1	2	3	4	5
9. I feel used up before I even start work	1	2	3	4	5
10. My home life makes me feel exhausted at the beginning of a work day	1	2	3	4	5

SECTION 3: GENERAL

(a) This part of the questionnaire asks about how you ***generally*** react to stress. Over the past 12 months, overall, when dealing with stressful situations, indicate on the tables below how these situations made you feel. **PLEASE REPLY TO ALL THE ITEMS.**

In general, stressful situations made me feel….

Circle your response choice for each item on the table:

Items	Not At All				A Great Deal
1. That I would appear to be unsuccessful	1	2	3	4	5
2. That I would appear to be incompetent	1	2	3	4	5
3. That I would appear to be an unsupportive person	1	2	3	4	5
4. That I would appear to be difficult to get along with	1	2	3	4	5
5. A sense of hostility from others	1	2	3	4	5

Over the past 12 months, overall, dealing with stressful situations could best be described as….

Circle your response choice for each item on the table:

Items	Not At All				A Great Deal
1. Situations where I needed to hold myself back from doing what I wanted	1	2	3	4	5
2. Situations where, if I deal with it in the way I wanted, it would have made things difficult for me	1	2	3	4	5

(b) This section asks about the degree of ***control*** or influence you have ***generally*** over your life.

Circle your response choice for each item on the table:

Items	Strongly Agree	Agree	Disagree	Strongly Disagree
1. I have little control over the things that happen to me	1	2	3	4
2. There is little I can do to change many of the important things in my life	1	2	3	4
3. There is really no way I can solve some of the problems I have	1	2	3	4

(c) This part of the questionnaire looks at how you ***generally*** feel and behave.

Circle your response choice for each item on the table:

items	Almost never	Quite seldom	Quite often	Almost always
1. Does your mood go up and down	1	2	3	4
2. Do you feel "just miserable" for no good reason	1	2	3	4
3. Are you troubled by feelings of guilt	1	2	3	4
4. Would you call yourself tense or "highly strung"	1	2	3	4

(d) This section asks you to indicate what you ***usually*** do and feel, when you experience ***stressful events***.

Circle your response choice for each item on the table

Items	I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot
1. I try and come up with a strategy about what to do	1	2	3	4
2. I force myself to wait for the right time to do something	1	2	3	4
3. I ask people who have had similar experiences what they did	1	2	3	4
4. I talk to someone about how I feel	1	2	3	4
5. I look for something good in what is happening	1	2	3	4
6. I refuse to believe that it has happened	1	2	3	4
7. I make a plan of action	1	2	3	4
8. I hold off doing anything about it until the situation permits	1	2	3	4
9. I try to get advice from someone about what to do	1	2	3	4
10. I try to get emotional support from friends or relatives	1	2	3	4
11. I try to see it in a different light, to make it seem more positive	1	2	3	4
12. I pretend that it hasn't really happened	1	2	3	4

(e) This part of the questionnaire is concerned with your ***general state of health*** over the ***past few weeks.***

Circle your response choice for each item on the table:

HAVE YOU RECENTLY:-	CIRCLE YOUR CHOICE			
Been able to concentrate on whatever you are doing?	Better than usual	Same as usual	Less than usual	Much less than usual
Been losing confidence in yourself?	Not at all	No more than usual	Rather more than usual	Much more than usual
Felt that you were playing a useful part in things?	More so than usual	Same as usual	Less useful than usual	Much less usual
Lost much sleep over worry?	Not at all	No more than usual	Rather more than usual	Much more than usual
Felt capable of making decisions about things?	More so than usual	Same as usual	Less so than usual	Much less capable
Felt constantly under strain?	Not at all	No more than usual	Rather more than usual	Much more than usual
Been able to face up to your problems?	More so than usual	Same as usual	Less able than usual	Much less able
Felt that you couldn't overcome your difficulties?	Not at all	No more than usual	Rather more than usual	Much more than usual
Been able to enjoy your normal day-to-day activities?	More so than usual	Same as usual	Less so than usual	Much less than usual
Been feeling unhappy or depressed?	Not at all	No more than usual	Rather more than usual	Much more than usual
Been feeling reasonably happy all things considered?	More so than usual	No more than usual	Less so than usual	Much less than usual
Been thinking of yourself as a worthless person?	Not at all	No more than usual	Rather more than usual	Much more than usual

(f) This part of the questionnaire is concerned with gathering data for statistical comparison only

PLEASE PROVIDE THE FOLLOWING GENERAL INFORMATION:

Circle your response choice for each item on the table:

Gender: Male Female	**Date of Birth:** ……..
Current domestic status: Married/Co-habiting Widowed Divorced/Separated Single	
Do you have care of dependent children? Yes No	**Do you have care of other dependents?** Yes No
Length of current employment: ……..	**How many hours per week do you normally work?** ……..
What is your job title: Academic Staff Administrative & Clerical Management Manual Staff Technical staff Other	
Salary per annum: Below £10,000 £10–15,000 £15–20,000 £20–25,000 £25–30,000 £30–40,000 £40,000+	**How would you describe your work pattern:** Office hours Flexible hours Rotating shifts Set shift

Thank you very much for your co-operation in completing this questionnaire.

Please return this questionnaire via internal mail to myself **Julian Edwards** at **Middlesex University, School of Social Science, Psychology, Queensway, Enfield, EN3 4SF**

Questions regarding this research may be directed to myself (Tel: 020 8411 4256, E-mail: j.a.edwards@mdx.ac.uk), or Professor Andrew Guppy or Dr Tracey Cockerton at the above address.

APPENDIX 2.4

Middlesex University

Thank you for agreeing to participate in this research. Please complete the questionnaire and return to me either personally or to my office (room B216, Broadbent Building, Psychology Department, Enfield Campus). Alternatively, mail to me at the address given at the end of the questionnaire.

Although the questionnaire scales are somewhat repetitive across sections for your working life and social life, please be sure to answer all questions. There are no right or wrong answers.

This project is supervised by Professor Andrew Guppy and Dr Tracey Cockerton at Middlesex University (Psychology).

Please sign the following consent to participate.

I agree to take part in the following study, and can withdraw at any time.

Participant signature: ______________________________________

SECTION 1: YOUR UNIVERSITY WORKING LIFE

(a) These questions ask about how things have been going in the ***past few weeks*** in your ***life at University.*** **PLEASE REPLY TO ALL THE ITEMS.**

Circle your response choice for each item on the table

Items	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. I can do my work well	1	2	3	4	5
2. I sometimes think that I am not very competent in my work	1	2	3	4	5
3. I can deal with just about any problem	1	2	3	4	5
4. I find my work quite difficult	1	2	3	4	5
5. I feel better than most people at tackling work difficulties	1	2	3	4	5
6. In my work I often have trouble coping	1	2	3	4	5
7. In my work I like to set myself challenging targets	1	2	3	4	5
8. I am not interested in my work	1	2	3	4	5
9. I enjoy doing new things in my work	1	2	3	4	5
10. I prefer to avoid difficult activities in my work	1	2	3	4	5
11. In my work I make a special effort to try when thing seem difficult	1	2	3	4	5
12. I am not very concerned how things turn out in my work	1	2	3	4	5
13. I feel used up at the end of a day	1	2	3	4	5
14. My work makes me feel quite exhausted at the end of a day	1	2	3	4	5

(b) Thinking of the ***past few weeks,*** how much of the time has your ***working life at University*** made you feel the following...?

Circle your response choice for each item on the table:

Items	Never	Occasionally	Some of the time	Much of the time	Most of the time	All of the time
1. Tense	1	2	3	4	5	6
2. Worried	1	2	3	4	5	6
3. Calm	1	2	3	4	5	6
4. Relaxed	1	2	3	4	5	6
5. Gloomy	1	2	3	4	5	6
6. Miserable	1	2	3	4	5	6
7. Enthusiastic	1	2	3	4	5	6
8. Optimistic	1	2	3	4	5	6

(c) This section asks you to indicate ***how often*** each item occurs in your ***life at University.***

Use these response choices to answer the items below:

1 Less than once per month or never	2 Once or twice per month	3 Once or twice per week	4 Once or twice per day	5 Several times per day

Circle your response choice for each item on the table

Items	Circle Your Choice				
1. How often do you get into arguments with others?	1	2	3	4	5
2. How often do other people yell at you?	1	2	3	4	5
3. How often are people rude to you?	1	2	3	4	5
4. How often do other people do nasty things to you?	1	2	3	4	5
5. How often do your studies require you to work very fast?	1	2	3	4	5
6. How often do your studies require you to work very hard?	1	2	3	4	5
7. How often does your work leave you with little time to get things done?	1	2	3	4	5
8. How often is there a great deal to be done?	1	2	3	4	5
9. How often do you have to do more work than you can do well?	1	2	3	4	5

(d) This section asks you to indicate what you do and feel, when you experience ***stressful*** events in your ***working life at University.***

Tick your response choice for each item on the table

Items	Never	Rarely	Sometimes	Often	Always
1. I try to change the situation to get what I want	1	2	3	4	5
2. I make an effort to change my expectations	1	2	3	4	5
3. I tell myself the problem is unimportant	1	2	3	4	5
4. I try to turn my attention away from the problem	1	2	3	4	5
5. I try to let off steam	1	2	3	4	5
6. I focus my efforts on changing the situation	1	2	3	4	5
7. I try to adjust my expectations to meet the situation	1	2	3	4	5
8. I tell myself the problem isn't so serious after all	1	2	3	4	5
9. I try to keep my mind off the problem	1	2	3	4	5
10. I try to relieve my tension somehow.	1	2	3	4	5
11. I work on changing the situation to get what I want	1	2	3	4	5
12. I try to adjust my own standards	1	2	3	4	5
13. I tell myself the problem isn't such a big deal after all	1	2	3	4	5
14. I try to avoid thinking about the problem	1	2	3	4	5
15. I try to just get it off my chest	1	2	3	4	5
16. I talk to someone about how I feel	1	2	3	4	5
17 I try to get advice from someone about what to do	1	2	3	4	5
18. I discuss my feelings with someone	1	2	3	4	5
19. I talk to someone to find out more about the situation	1	2	3	4	5

(e) This next section concerns how you ***perceive your work performance at University*** to be over the ***past three months.***

Circle your response choice for each item on the table:

Items	Noticeably Better	Somewhat Better	About The Same	Somewhat Worse	Noticeably Worse
1. Your overall work performance	1	2	3	4	5
2. Your relationship with your colleagues	1	2	3	4	5
3. Your relationship with your supervisors & tutors	1	2	3	4	5

(f) This section asks about the degree of ***control*** or influence you have over your ***University life.***

Circle your response choice for each item on the table:

Items	Strongly Agree	Agree	Disagree	Strongly Disagree
1. I have little control over the things that happen to me at University	1	2	3	4
2. There is little I can do to change many of the important things in life at University	1	2	3	4
3. What happens to me in the future at University mostly depends on me	1	2	3	4

(g) This part of the questionnaire asks about how you react to stressful events in your ***working life at University***. In view of the ***most recent***, personally important stressful event you experienced, indicate on the tables below how this event made you feel.

This event made me feel....

Circle your response choice for each item on the table:

Items	**Not At All**				**A Great Deal**
1. That I would appear to be unsuccessful	1	2	3	4	5
2. That I would appear to be incompetent	1	2	3	4	5
3. That I would appear to be an unsupportive person	1	2	3	4	5
4. That I would appear to be difficult to get along with	1	2	3	4	5
5. A sense of hostility from others	1	2	3	4	5

In the past, a personally stressful event could best be described as....

Circle your response choice for each item on the table:

Items	**Not At All**				**A Great Deal**
1. One where I needed to hold myself back from doing what I wanted	1	2	3	4	5
2. One where, if I deal with it in the way I wanted, it would have made things difficult for me	1	2	3	4	5

SECTION 2: YOUR SOCIAL LIFE

(a) These questions ask about how things have been going in the ***past few weeks*** in your ***life outside of work*** (i.e. not your University work and/or paid employment).
PLEASE REPLY TO ALL THE ITEMS.

Circle your response choice for each item on the table:

Items	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
1. Most things I do, I do well	1	2	3	4	5
2. I sometimes think that I am not very competent in my non-working life	1	2	3	4	5
3. I can deal with just about any problem outside of work	1	2	3	4	5
4. I find my life outside of work quite difficult	1	2	3	4	5
5. I feel better than most people at tackling difficulties	1	2	3	4	5
6. I often have trouble coping outside of work	1	2	3	4	5
7. I like to set myself challenging targets outside of work	1	2	3	4	5
8. I am not interested in the world around me	1	2	3	4	5
9. I enjoy doing new things outside of work	1	2	3	4	5
10. I prefer to avoid difficult activities outside of work	1	2	3	4	5
11. I make a special effort to keep trying when things seem difficult	1	2	3	4	5
12. I am not very concerned how things turn out, outside of work	1	2	3	4	5
13. I feel used up before I even start work	1	2	3	4	5
14. My home life makes me feel exhausted at the beginning of a work day	1	2	3	4	5

(b) Thinking of the ***past few weeks,*** how much of the time has your ***non-working life*** made you feel the following.....?

Circle your response choice for each item on the table:

Items	**Never**	**Occasionally**	**Some of the time**	**Much of the time**	**Most of the time**	**All of the time**
1. Tense	1	2	3	4	5	6
2. Worried	1	2	3	4	5	6
3. Calm	1	2	3	4	5	6
4. Relaxed	1	2	3	4	5	6
5. Gloomy	1	2	3	4	5	6
6. Miserable	1	2	3	4	5	6
7. Enthusiastic	1	2	3	4	5	6
8. Optimistic	1	2	3	4	5	6

(c) This section asks you to indicate ***how often*** each item occurs in your ***life outside of work***.

Use these response choices to answer the items below:

1 Less than once per month or never	2 Once or twice per month	3 Once or twice per week	4 Once or twice per day	5 Several times per day

Circle your response choice for each item on the table

Items	Circle Your Choice				
1. How often are people rude to you in your life outside of work?	1	2	3	4	5
2. How often do other people do nasty things to you outside of work?	1	2	3	4	5
3. How often does your life outside of work leave you with little time to get things done?	1	2	3	4	5
4. How often is there a great deal to be done in your life outside of work?	1	2	3	4	5
5. How often do you have to do more work than you can do well outside of work?	1	2	3	4	5

(d) This section asks you to indicate what you do and feel, when you experience ***stressful events*** in your ***life outside*** **of work**.

Tick your response choice for each item on the table

Items	Never	Rarely	Sometimes	Often	Always
1. I try to change the situation to get what I want	1	2	3	4	5
2. I make an effort to change my expectations	1	2	3	4	5
3. I tell myself the problem is unimportant	1	2	3	4	5
4. I try to turn my attention away from the problem	1	2	3	4	5
5. I try to let off steam	1	2	3	4	5
6. I focus my efforts on changing the situation	1	2	3	4	5
7. I try to adjust my expectations to meet the situation	1	2	3	4	5
8. I tell myself the problem isn't so serious after all	1	2	3	4	5
9. I try to keep my mind off the problem	1	2	3	4	5
10. I try to relieve my tension somehow.	1	2	3	4	5
11. I work on changing the situation to get what I want	1	2	3	4	5
12. I try to adjust my own standards	1	2	3	4	5
13. I tell myself the problem isn't such a big deal after all	1	2	3	4	5
14. I try to avoid thinking about the problem	1	2	3	4	5
15. I try to just get it off my chest	1	2	3	4	5
16. I talk to someone about how I feel	1	2	3	4	5
17 I try to get advice from someone about what to do	1	2	3	4	5
18. I discuss my feelings with someone	1	2	3	4	5
19. I talk to someone to find out more about the situation	1	2	3	4	5

(e) This section asks about the degree of ***control*** or influence you have over your ***non-working life***.

Circle your response choice for each item on the table:

Items	Strongly Agree	Agree	Disagree	Strongly Disagree
1. I have little control over the things that happen to me	1	2	3	4
2. There is little I can do to change many of the important things in my life	1	2	3	4
3. There is really no way I can solve some of the problems I have	1	2	3	4

SECTION 3: GENERAL

(a) This part of the questionnaire looks at how you ***generally*** feel and behave.

Circle your response choice for each item on the table:

Items	Almost never	Quite seldom	Quite often	Almost always
1. Does your mood go up and down	1	2	3	4
2. Do you feel "just miserable" for no good reason	1	2	3	4
3. Are you troubled by feelings of guilt	1	2	3	4
4. Would you call yourself tense or "highly strung"	1	2	3	4

(b) This part of the questionnaire is concerned with your ***general state of health*** over the ***past few weeks.***

Circle your response choice for each item on the table:

HAVE YOU RECENTLY:-	CIRCLE YOUR CHOICE			
Felt that you were playing a useful part in things?	More so than usual	Same as usual	Less useful than usual	Much less useful
Felt constantly under strain?	Not at all	No more than usual	Rather more than usual	Much more than usual
Felt capable of making decisions about things?	More so than usual	Same as usual	Less so than usual	Much less capable
Felt you couldn't overcome your difficulties?	Not at all	No more than usual	Rather more than usual	Much more than usual
Been able to enjoy your normal day-to-day activities?	More so than usual	Same as usual	Less so than usual	Much less than usual
Been feeling unhappy and depressed?	Not at all	No more than usual	Rather more than usual	Much more than usual
Been feeling reasonably happy, all things considered?	More so than usual	About same as usual	Less so than usual	Much less than usual
Been losing confidence in yourself?	Not at all	No more than usual	Rather more than usual	Much more than usual

(d) This part of the questionnaire concerns the degree to which you are able to spot the ***emotions other people are feeling***.

Circle your response choice for each item on the table:

Items	Strongly Disagree					Strongly Agree	
1. I can see when a friend is angry with me just by looking at them	1	2	3	4	5	6	7
2. I can recognise people who are shy amongst strangers	1	2	3	4	5	6	7
3. In any social situation, I know who wants to be the centre of attention	1	2	3	4	5	6	7
4. I am very aware of when other people are feeling nervous or embarrassed in public	1	2	3	4	5	6	7
5. I can tell a lot about what a person is experiencing by looking at their facial expression	1	2	3	4	5	6	7
6. I am able to tell whether someone is anxious or not just by observing their body language	1	2	3	4	5	6	7
7. When someone smiles at me, I can tell whether it is false or it is really meant	1	2	3	4	5	6	7

(e) This part of the questionnaire is concerned with gathering data for statistical comparison only.
PLEASE PROVIDE THE FOLLOWING GENERAL INFORMATION:

Circle your response choice for each item on the table:

Gender: Male Female	**Date of Birth:**			
Current domestic status:	Married/Co-habiting	Widowed	Divorced/Separated	Single
Do you have care of dependent children?		Yes	No	
Do you have care of other dependents?		Yes	No	
Do you have a job outside of University?		Yes	No	
If yes, what is tour job title?				
Length of current employment:				
Is your job: Part-time Full-time				
How many hours per week do you normally work?				
Salary per annum: Below £5,000 £5-10,000 £10–15,000 £15–20,000 £20–25,000 £25–30,000 £30–40,000 £40,000+	**How would you describe your work pattern:** Office hours Flexible hours Rotating Shifts Set Shift			

Thank you very much for your co-operation in completing this questionnaire.

If you are returning the questionnaire to me via post, please return to myself **Julian Edwards** at **Middlesex University, School of Social Science, Psychology, Queensway, Enfield, EN3 4SF**

Questions regarding this research may be directed to myself (Tel: 020 8411 4256, E-mail: j.a.edwards@mdx.ac.uk), or Professor Andrew Guppy or Dr Tracey Cockerton at the above address.

APPENDIX 2.5

PILOT STUDY RESEARCHING MEASURES OF STRESS & WELL-BEING WITHIN THE WORKPLACE

This questionnaire is a pilot study to assess the following scale reliabilities measuring aspects of stress and well-being in work, non-work and context-free domains. This preliminary analysis has been undertaken in order to design a more comprehensive and complete forthcoming questionnaire as part of my PhD research.

Your co-operation in completing this very short questionnaire would be greatly appreciated. There are no right or wrong answers to the questions in the survey and we do not ask you to give your name. Responses to the questionnaire will not be viewed by anyone apart from myself and my Supervisor Professor Andrew Guppy.

Even though some of the items in the questionnaire may not seem to relate to you or may be difficult to decide, please be sure to answer all questions.

SECTION 1: YOUR WORKING LIFE

(a) This part of the questionnaire asks about how you react to stressful events in your ***working life.*** In view of the ***most recent***, personally important stressful event you experienced, indicate on the tables below how this event made you feel.
PLEASE REPLY TO ALL THE ITEMS.

This event made me feel....

Circle your response choice for each item on the table:

Items	Not At All				A Great Deal
1. That I would not achieve an important goal	1	2	3	4	5
2. That I would appear to be incompetent	1	2	3	4	5
3. That I would appear to be unsuccessful	1	2	3	4	5
4. That I would appear to be difficult to get along with	1	2	3	4	5
5. That I would appear to be an unsupportive person	1	2	3	4	5
6. A sense of hostility from others	1	2	3	4	5

In the past, a personally stressful event could best be described as....

Circle your response choice for each item on the table:

Items	Not At All				A Great Deal
1. One where I needed to hold myself back from doing what I wanted	1	2	3	4	5
2. One where bureaucracy made it difficult to deal with	1	2	3	4	5
3. One where, if I deal with it in the way I wanted, it would have made things difficult for me	1	2	3	4	5

(b) This section asks you to indicate what you do and feel, when you experience ***stressful*** events in your life ***at work***.

Circle your response choice for each item on the table

Items	I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot
1. I ask people who have had similar experiences what they did	1	2	3	4
2. I talk to someone about how I feel	1	2	3	4
3. I try to get advice from someone about what to do	1	2	3	4
4. I try to get emotional support from friends or relatives	1	2	3	4
5. I talk to someone to find out more about the situation	1	2	3	4
6. I discuss my feelings with someone	1	2	3	4

SECTION 2: YOUR NON-WORKING LIFE

(a) This part of the questionnaire asks about how you react to stressful events in your **non-*working life.*** In view of the ***most recent***, personally important stressful event you experienced, indicate on the tables below how this event made you feel.
PLEASE REPLY TO ALL THE ITEMS.

This event made me feel....

Circle your response choice for each item on the table:

Items	Not At All				A Great Deal
1. That I would not achieve an important goal	1	2	3	4	5
2. That I would appear to be incompetent	1	2	3	4	5
3. That I would appear to be unsuccessful	1	2	3	4	5
4. That I would appear to be difficult to get along with	1	2	3	4	5
5. That I would appear to be an unsupportive person	1	2	3	4	5
6. A sense of hostility from others	1	2	3	4	5

In the past, a personally stressful event could best be described as....

Circle your response choice for each item on the table:

Items	Not At All				A Great Deal
1. One where I needed to hold myself back from doing what I wanted	1	2	3	4	5
2. One where the situation made it difficult to deal with	1	2	3	4	5
3. One where, if I deal with it in the way I wanted, it would have made things difficult for me	1	2	3	4	5

(b) This section asks you to indicate what you do and feel, when you experience ***stressful*** events in your life ***outside of work***.

Circle your response choice for each item on the table

Items	I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot
1. I ask people who have had similar experiences what they did	1	2	3	4
2. I talk to someone about how I feel	1	2	3	4
3. I try to get advice from someone about what to do	1	2	3	4
4. I try to get emotional support from friends or relatives	1	2	3	4
5. I talk to someone to find out more about the situation	1	2	3	4
6. I discuss my feelings with someone	1	2	3	4

(c) This section asks you to indicate ***how often*** each item occurs in your ***non-working life***.
PLEASE REPLY TO ALL THE ITEMS.

Use these response choices to answer the items below:

1 Less than once per month or never	2 Once or twice per month	3 Once or twice per week	4 Once or twice per day	5 Several times per day

Circle your response choice for each item on the table

Items	Circle Your Choice				
1. How often do you get into arguments with others in your life outside of work?	1	2	3	4	5
2. How often do other people yell at you in your life outside of work?	1	2	3	4	5
3. How often are people rude to you in your life outside of work?	1	2	3	4	5
4. How often do other people do nasty things to you outside of work?	1	2	3	4	5
5. How often does your life outside of work require you to work very fast?	1	2	3	4	5
6. How often does your life outside of work require you to work very hard?	1	2	3	4	5
7. How often does your life outside of work leave you with little time to get things done?	1	2	3	4	5
8. How often is there a great deal to be done in your life outside of work?	1	2	3	4	5
9. How often do you have to do more work than you can do well outside of work?	1	2	3	4	5

SECTION 3: GENERAL

(a) This part of the questionnaire asks about how you ***generally*** react to stress. Over the past 12 months, overall, when dealing with a stressful situation, indicate on the tables below how stressful have these situations made you feel. **PLEASE REPLY TO ALL THE ITEMS.**

This situation made me feel....

Circle your response choice for each item on the table:

Items	Not At All				A Great Deal
1. That I would not achieve an important goal	1	2	3	4	5
2. That I would appear to be incompetent	1	2	3	4	5
3. That I would appear to be unsuccessful	1	2	3	4	5
4. That I would appear to be difficult to get along with	1	2	3	4	5
5. That I would appear to be an unsupportive person	1	2	3	4	5
6. A sense of hostility from others	1	2	3	4	5

Over the past 12 months, overall, dealing with a stressful situation could be best described as

Circle your response choice for each item on the table:

Items	Not At All				A Great Deal
1. One where I needed to hold myself back from doing what I wanted	1	2	3	4	5
2. One where the situation made it difficult to deal with	1	2	3	4	5
3. One where, if I deal with it in the way I wanted, it would have made things difficult for me	1	2	3	4	5

If you have any questions regarding the questionnaire or research, please contact myself at the address below:

Julian Edwards
School of Social Science
Department of Psychology
Middlesex University
Queensway, Enfield, EN3 4SF
Tel: 020-8411-4256
E-mail: j.a.edwards@mdx.ac.uk

APPENDIX 2.6

Special Request :

Investigating Workplace Stress

Julian Edwards, currently studying for a PhD in Occupational Psychology is investigating workplace stress.

Current figures from the Health and Safety Executive show that as many as one in five people are suffering from high levels of work-related stress - that's around 5 million workers.

The research will assess aspects of psychological well-being, and stress in the work, non-work and context-free environments.

If you wish to participate in the research please download the short questionnaire. Return completed forms, via internal mail, to Julian Edwards at the School of Social Science, Enfield. (All information given will be treated in the strictest confidence).

Special Notice :

Did you know?

To raise money for the University's Scholarship Fund, Michael Driscoll, the Vice-Chancellor, runs the London marathon on 22 April.
The Scholarship Fund gives cash awards to Middlesex University students who demonstrate excellence in Sporting Achievement, Academic Achievement or Community/Cultural activity. Well over a hundred scholarships have already been awarded.

If you'd like to support the marathon run -either with a one-off amount or at so much per mile (there are 26 of them!) there is an easy way to pledge your support - just email scholarship@mdx.ac.uk

Important Announcements:

Latest Updates

Human Resource Services

Negotiating Committees

Estates and Facilities

Executive News

University Documents: Memorandum of Understanding

Estates News

Health and Safety

Centre for Learning Development

Updated Regularly

University Diary

HE News

Staff Vacancies

Special Request:

Did you fill in the Stress Questionnaire?

Julian Edwards, currently studying for a PhD in Occupational Psychology has been investigating workplace stress. His research will assess aspects of psychological well-being, and stress in the work, non-work and context-free environments. As part of this research colleagues were asked to complete a questionnaire, with request for co-operation in completing follow up questionnaires in order to explore whether your responses are stable over time. (NB: There will be another questionnaire at the start of next academic year.)

Thank you for your co-operation in completing this follow up questionnaire. Please note that information given shall be treated in the strictest confidence.

Please download and print off the self-report questionnaire [PDF] to fill in and return to Julian Edwards (PhD Student, Psychology, School of Social Science, Enfield Campus) via internal mail.

Latest Updates
Financial Services
HCS
Human Resource Services
Negotiating Committees
Estates and Facilities
Executive News
Updated Regularly
University Diary
HE News
Staff Vacancies

Stress in the workplace

The final Questionnaire

Julian Edwards (x4256) invites participants in his research to complete a follow-up questionnaire. Julian is researching psychological well-being and stress in the workplace.

Thank you very much if you agreed to participate in my research over the past few months by completing the questionnaires sent to you to assess psychological well-being and stress in the workplace.

The final self-report questionnaire is available to download as a PDF file. Please print off the questionnaire fill it in and return to me via internal mail. Your co-operation in completing this final follow-up questionnaire would be greatly appreciated. **Please note that information given shall be treated in the strictest confidence.**

APPENDIX 2.7

Stress in Middlesex University Students

Hi Fellow Students,

My name is Julian Edwards and I am currently studying for a PhD i Occupational Psychology here at Middlesex University. I would be \ grateful if you would consider taking part in my research by compl short questionnaire, which is to assess aspects of psychological well-being and stress.

Your co-operation in completing my questionnaire would be greatl appreciated. If you agree to take part and complete the questionna please download the short questionnaire, [Available to download ir print-out and return to me via envelope either by use of your camp internal mail facility (by handing in at your mail room or at recepti by mailing to me externally. My address is given at the end of the questionnaire.

Alternatively, please inform me via e-mail of your locality (campus building, locality of student mail tray or similar alternative (office number, home address etc) and your student number in order for send you a copy of the questionnaire. Questionnaires are also avail outside my office (B216) and in the Psychology Department (Broac building, Enfield). Alternatively, simply send me an e-mail indicatir you agree to participate and I will send you an attached questionn

My e-mail address is: julian6@mdx.ac.uk Thank you for your time effort with this research.

Julian

Did you complete the student stress questionnaire?

Hi Fellow Students,

Thank you very much if you agreed to participate in my research o the past few months or last semester by completing my questionnа assess psychological well-being and stress in Middlesex University students.

As initially stated, a second and final questionnaire would be asked completed by you in order for responses to be measured over time co-operation in completing this final follow-up questionnaire would greatly appreciated. Please note again that involvement is purely voluntary and all information given shall be treated in the strictest confidence.

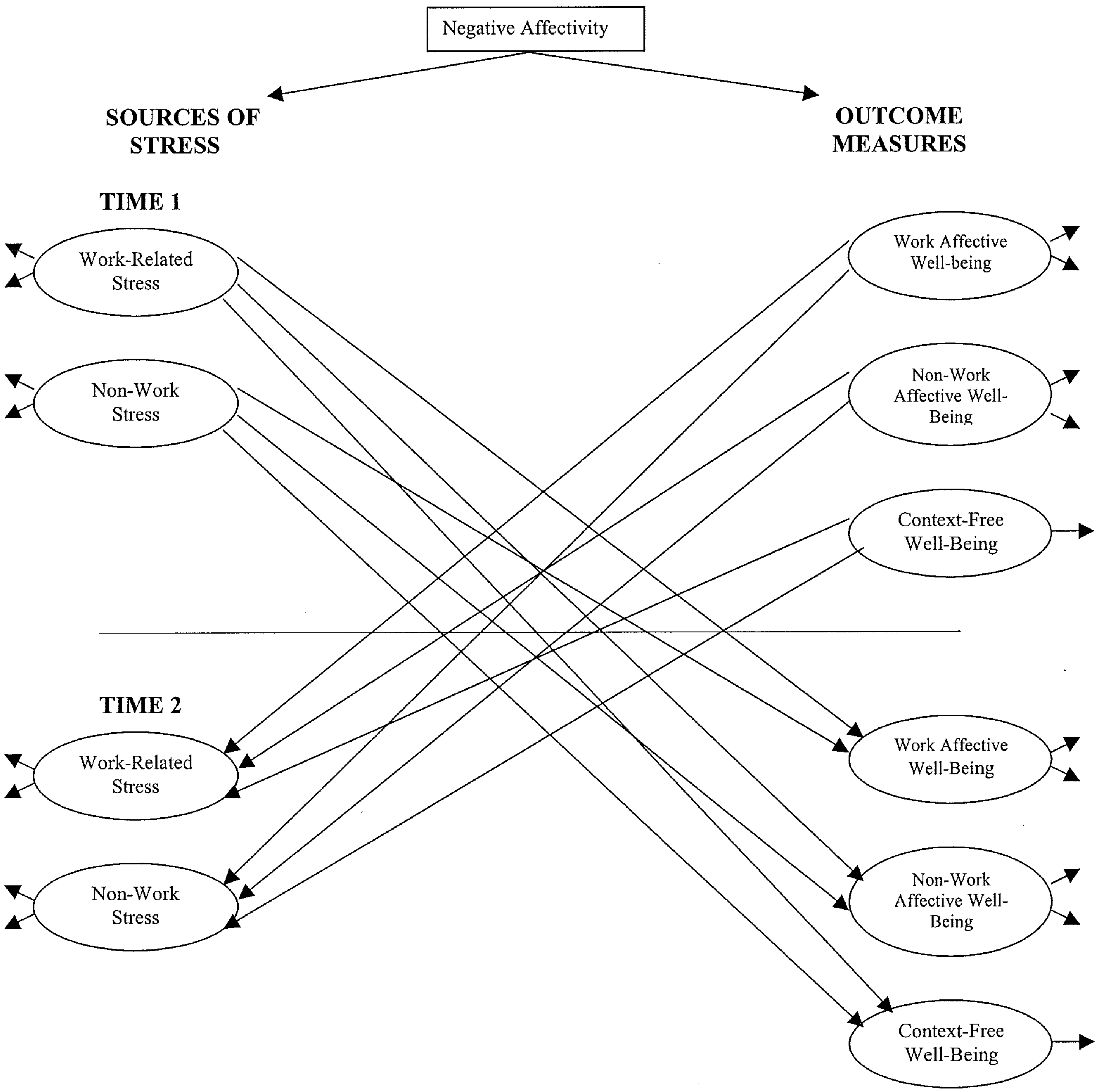
If you agree to take part and complete the questionnaire, [Availabl download in PDF], print-out, fill-in and return to me via envelope e by use of your campus internal mail facility (by handing in at your room or at reception) or by mailing to me externally. My address is at the end of the questionnaire.

Alternatively, please inform me via e-mail of your locality (campus building, locality of student mail tray or similar alternative (office number, home address etc) and your student number in order for I send you a copy of the questionnaire. Questionnaires are also avail outside my office (B216) and in the Psychology Department (Broac building, Enfield). Alternatively, simply send me an e-mail indicatir you agree to participate and I will send you an attached questionn

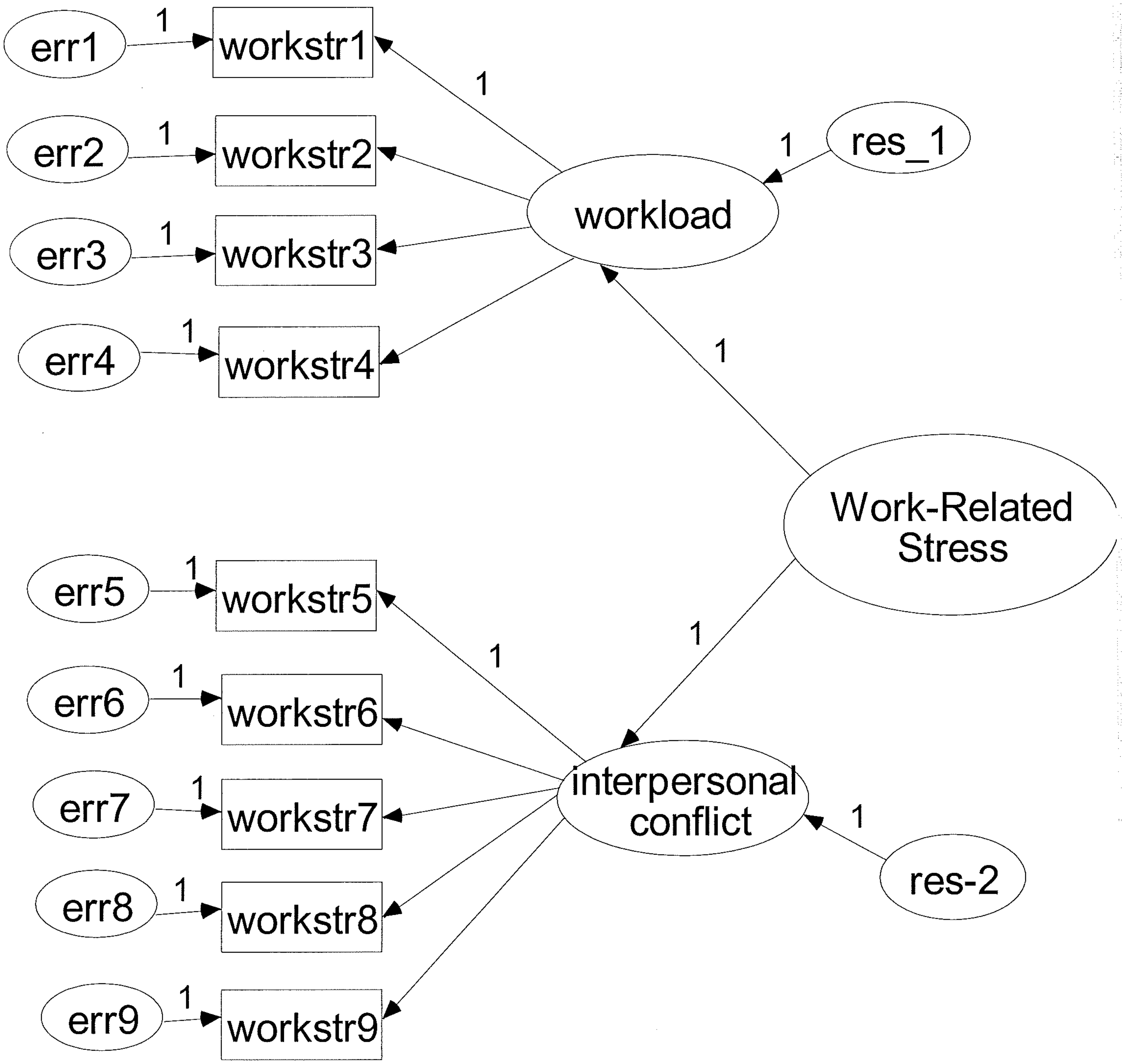
My e-mail address is: julian6@mdx.ac.uk
Thank you once again for your time and effort with this research.
Julian

APPENDIX 3.1

Appendix 3.1: Accompanying Hypothesised Theoretical Structural Equation Model for Research Hypothesis One

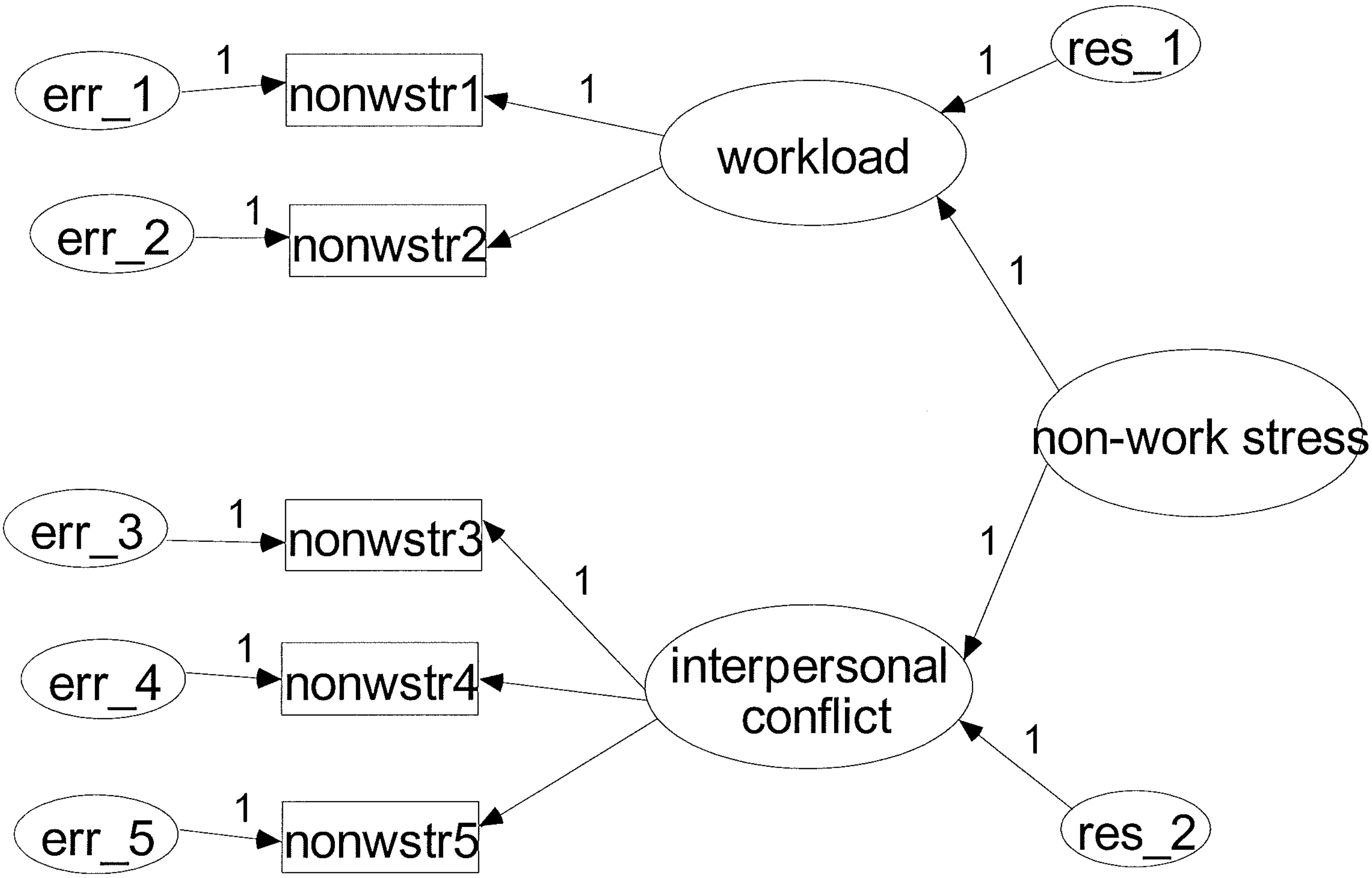


Appendix 3.2: Confirmatory Factor Analysis of the Work-Related Stress Measurement Model



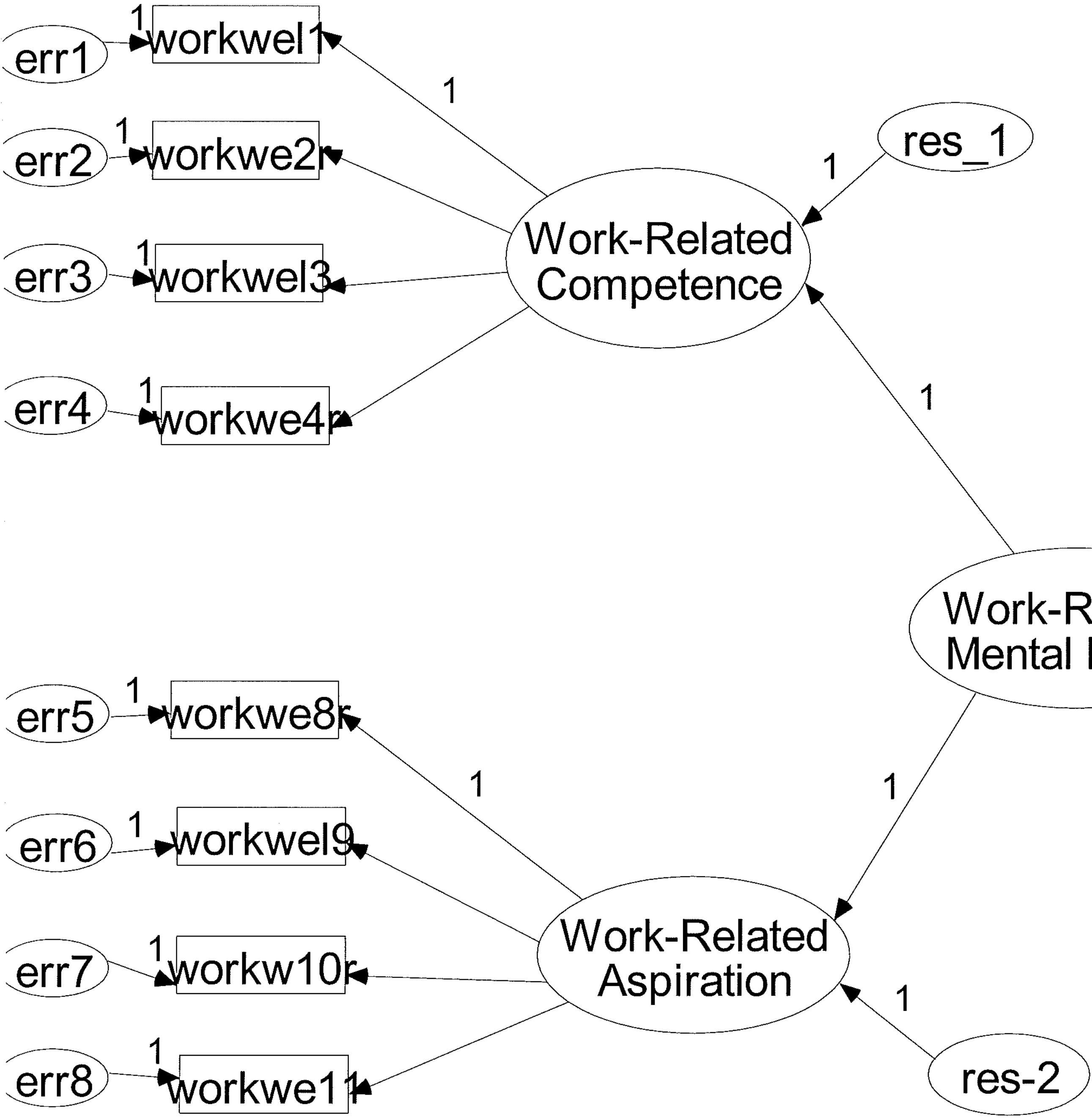
Chi-Square = 333.92 (26 df)
p = .00
GFI = .94
NFI = .91
CFI = .91

Appendix 3.3: Confirmatory Factor Analysis of the Non-Work Stress Measurement Model



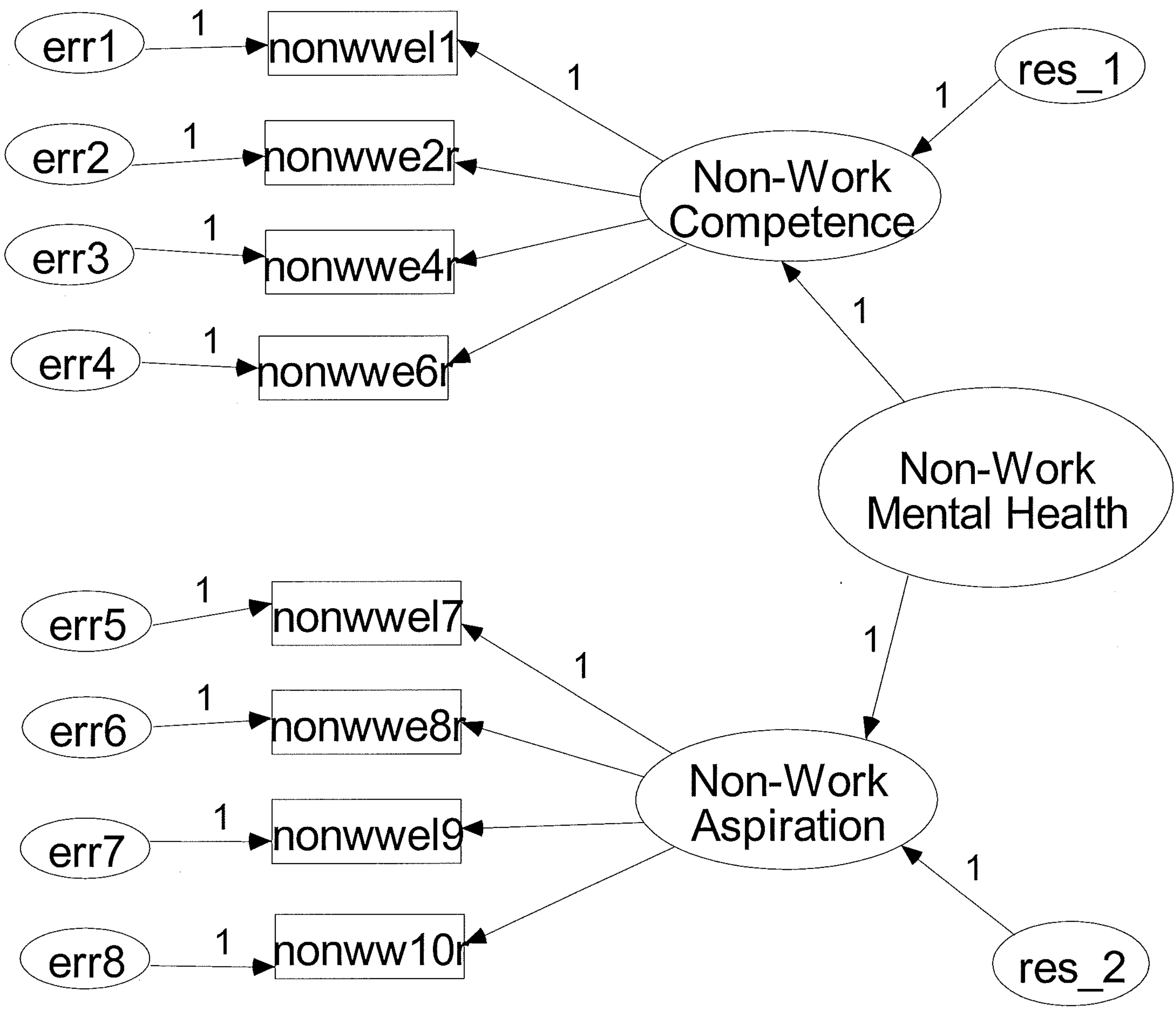
Chi-square = 44.64 (4 df)
p = .00
GFI = .98
NFI = .98
CFI = .98

Appendix 3.4 Confirmatory Factor Analysis of the Work-Related Mental Health Measurement Model



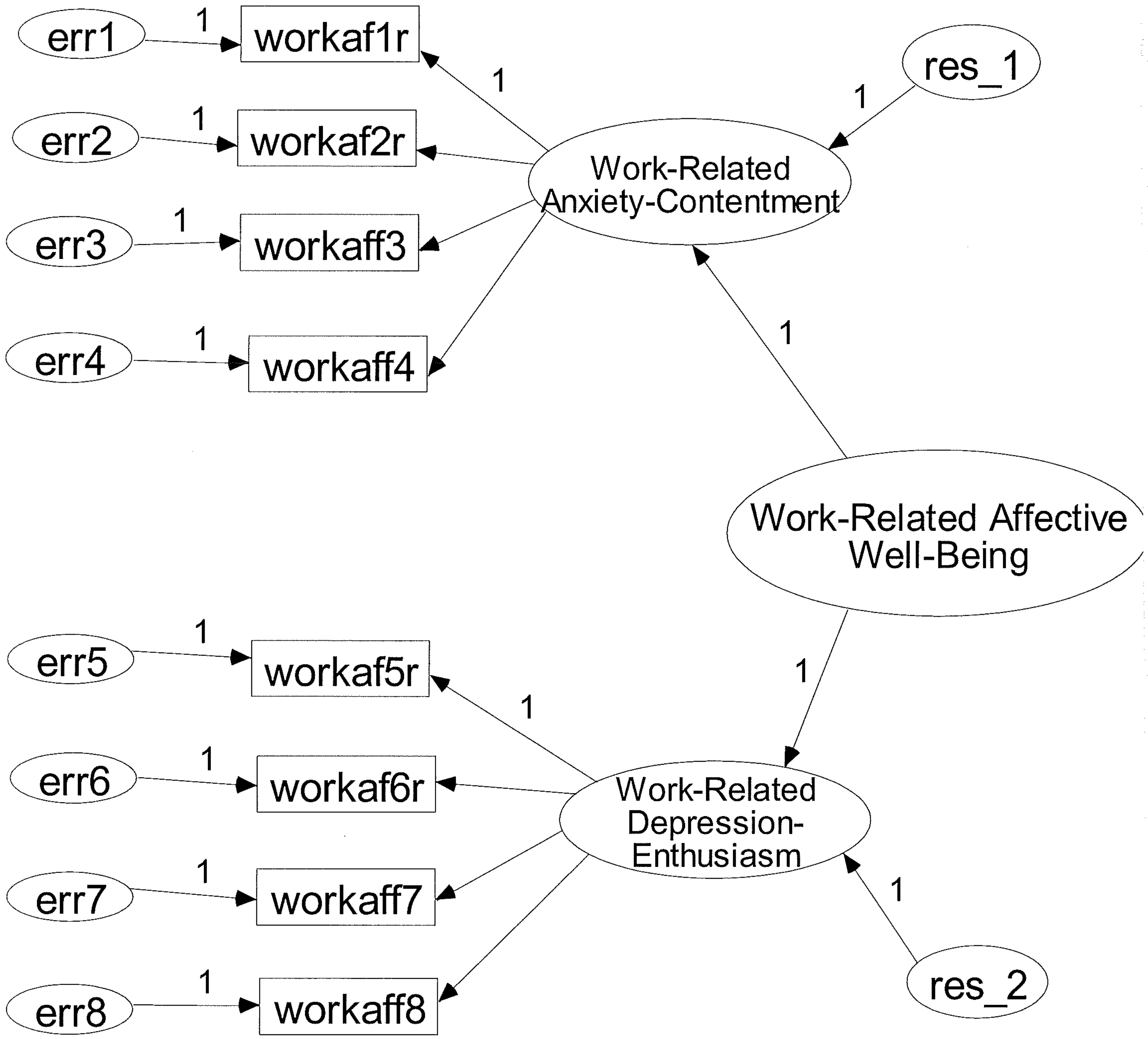
Chi- Square = 131.22 (19 df)
p = .00
GFI = .97
NFI = .84
CFI = .86

Appendix 3.5 Confirmatory Factor Analysis of the Non-Work Mental Health Measurement Model



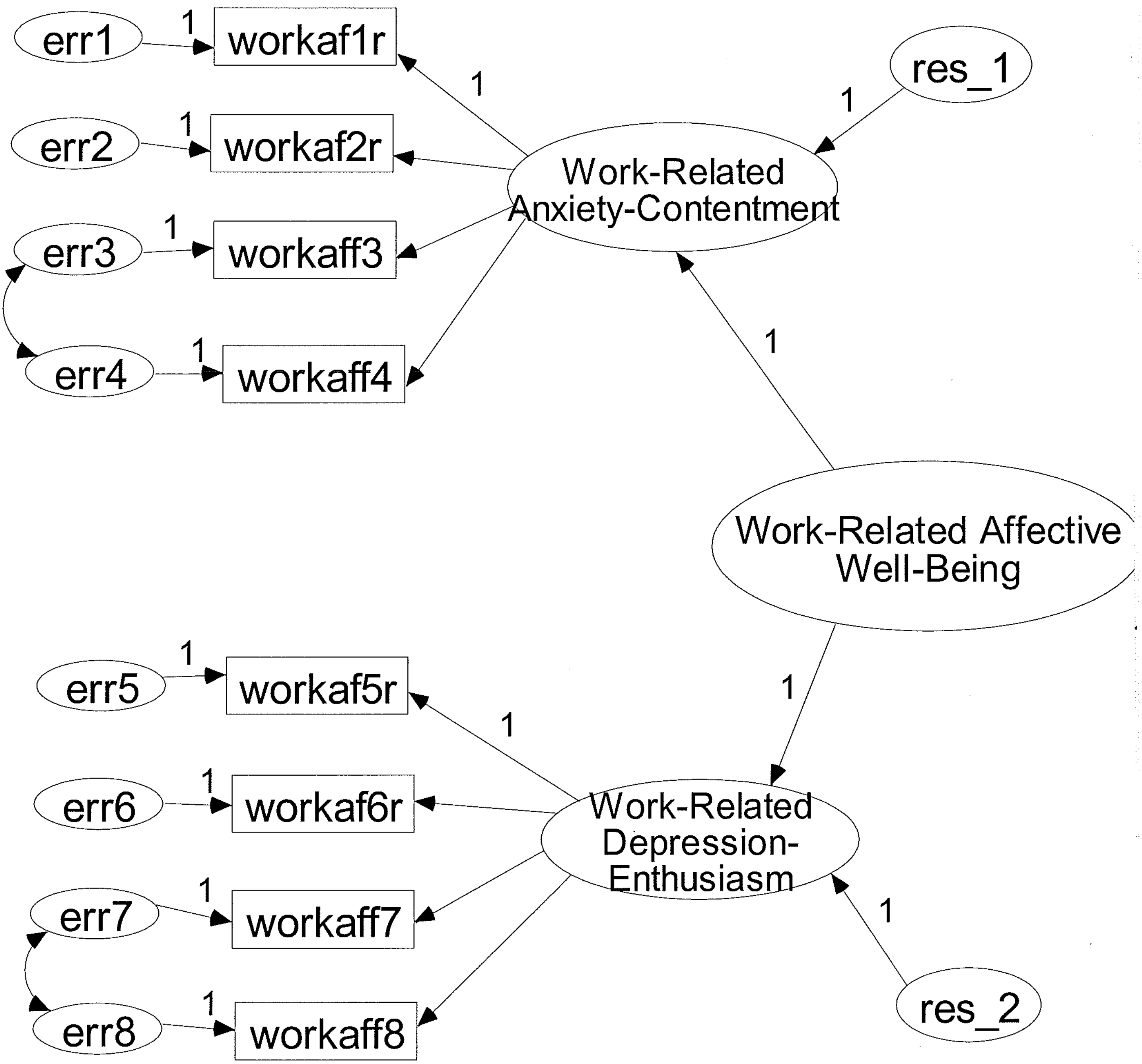
Chi-Square = 149.55 (19 df)
p = .00
GFI = .97
NFI = .89
CFI = .90

Appendix 3.6 Confirmatory Factor Analysis of the Work-Related Affective Well-Being Measurement Model



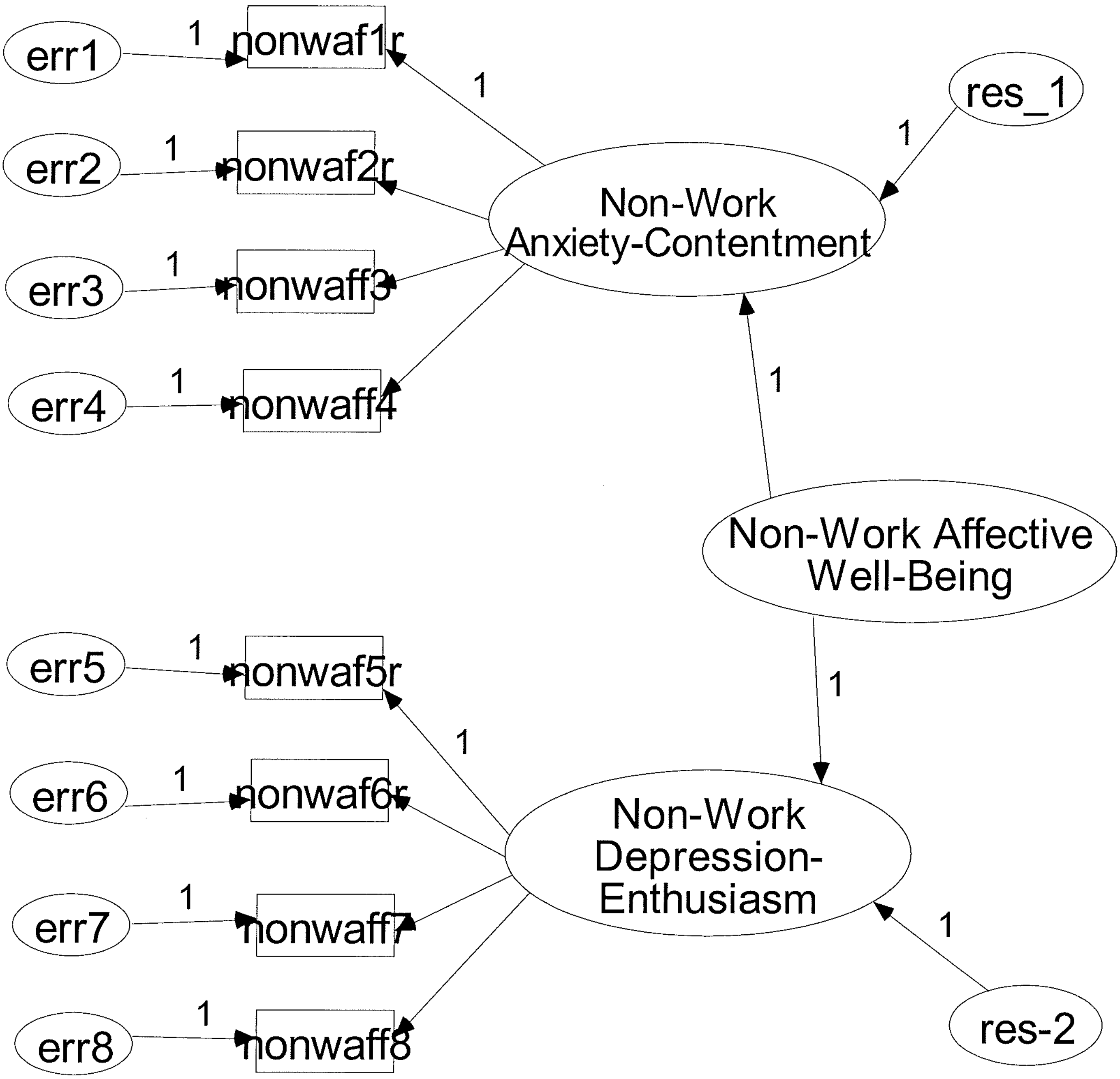
Chi-Square = 1605.12 (19 df)
p = .00
GFI = .73
NFI = .60
CFI = .61

Appendix 3.6a Modified Confirmatory Factor Analysis of the Work-Related Affective Well-Being Measurement Model



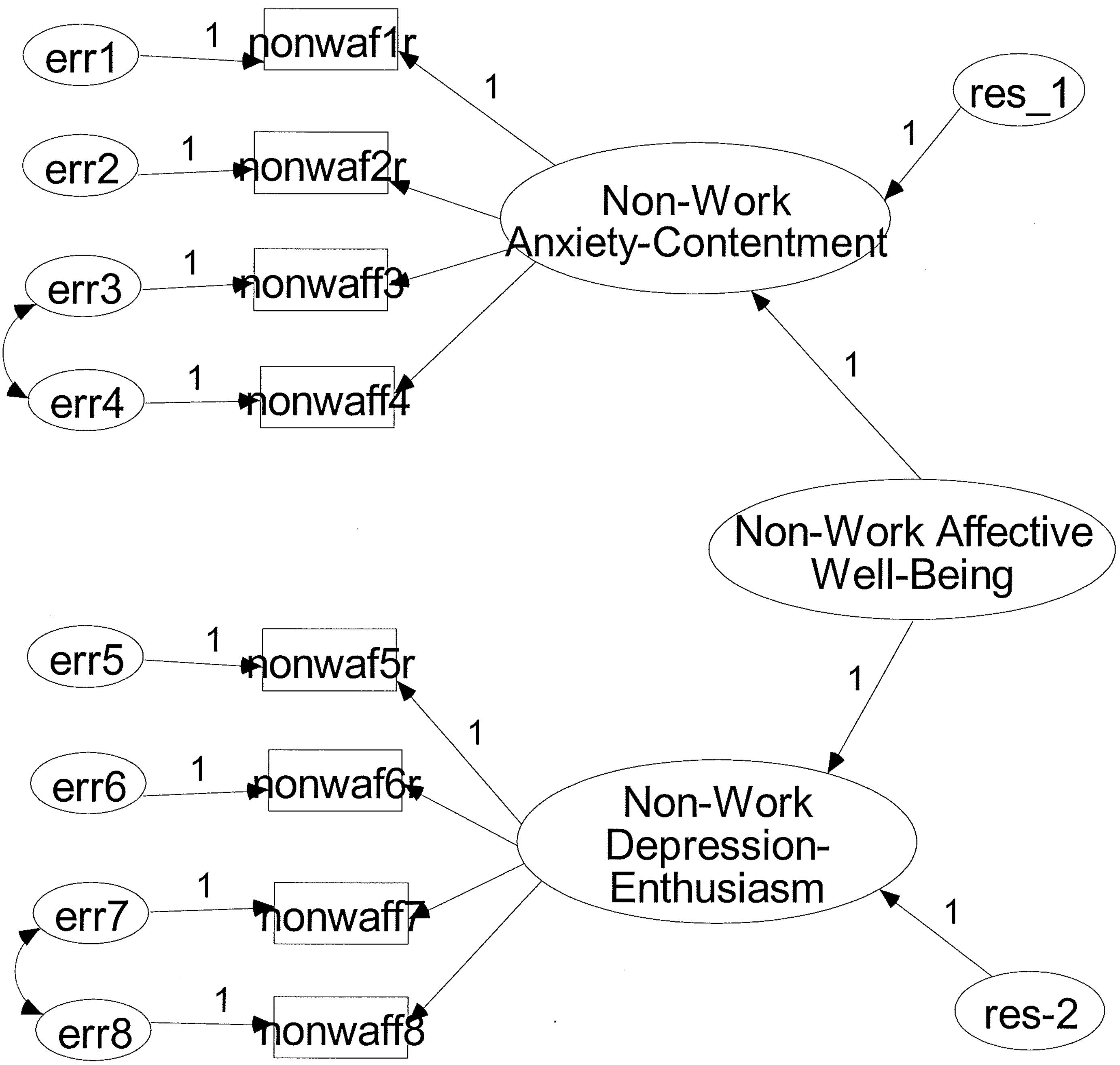
Chi-Square = 196.93 (17 df)
p = .00
GFI = .96
NFI = .95
CFI = .95

Appendix 3.7 Confirmatory Factor Analysis of the Non-Work Affective Well-Being Measurement Model



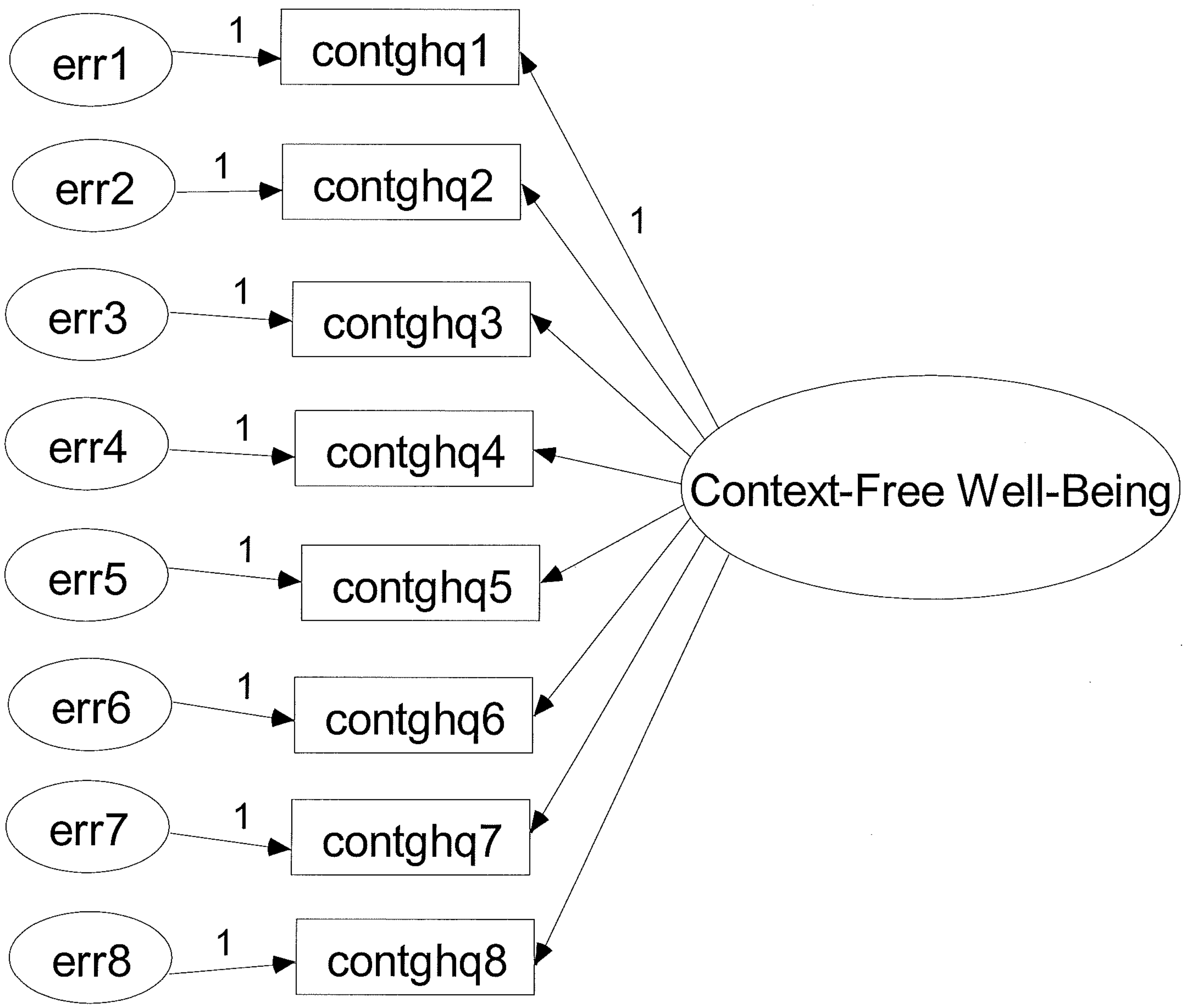
Chi-Square = 2082.16 (19 df)
p = .00
GFI = .66
NFI = .56
CFI = .56

Appendix 3.7a: Modified Confirmatory Factor Analysis of the Non-Work Affective Well-Being Measurement Model



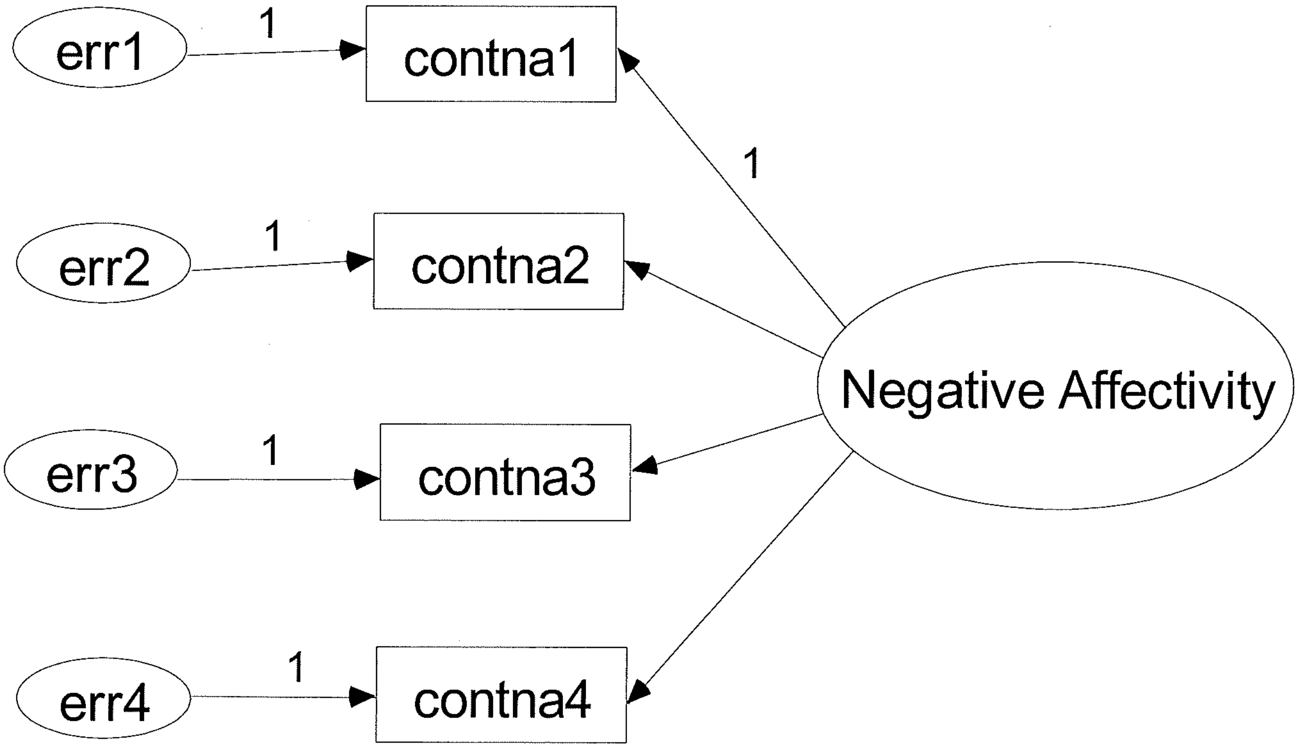
Chi-Square = 396.71 (17 df)
p = .00
GFI = .93
NFI = .92
CFI = .92

Appendix 3.8 Confirmatory Factor Analysis of the Context-Free Well-Being Measurement Model



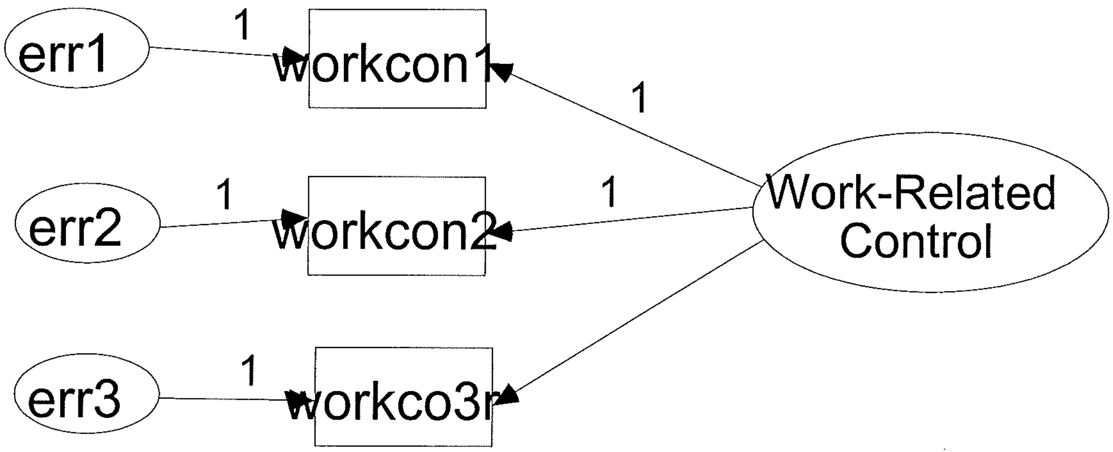
Chi-Square = 163.94 (20df)
p = .00
GFI = .96
NFI = .94
CFI = .94

Appendix 3.9 Confirmatory Factor Analysis of the Negative Affectivity Measurement Model



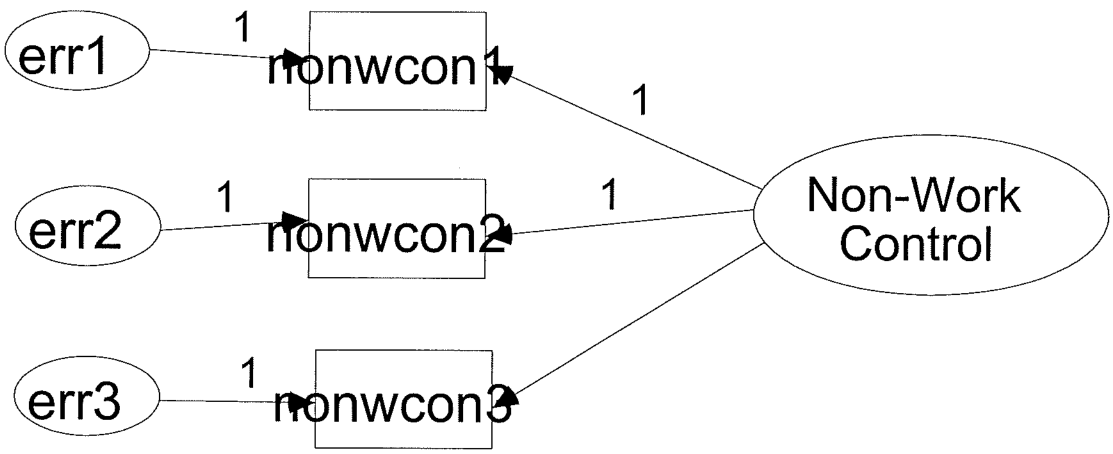
Chi-Square = 22.38 (2 df)
p = .00
GFI = .99
NFI = .98
CFI = .98

Appendix 3.10: Confirmatory Factor Analysis of the Work-Related Control Measurement Model



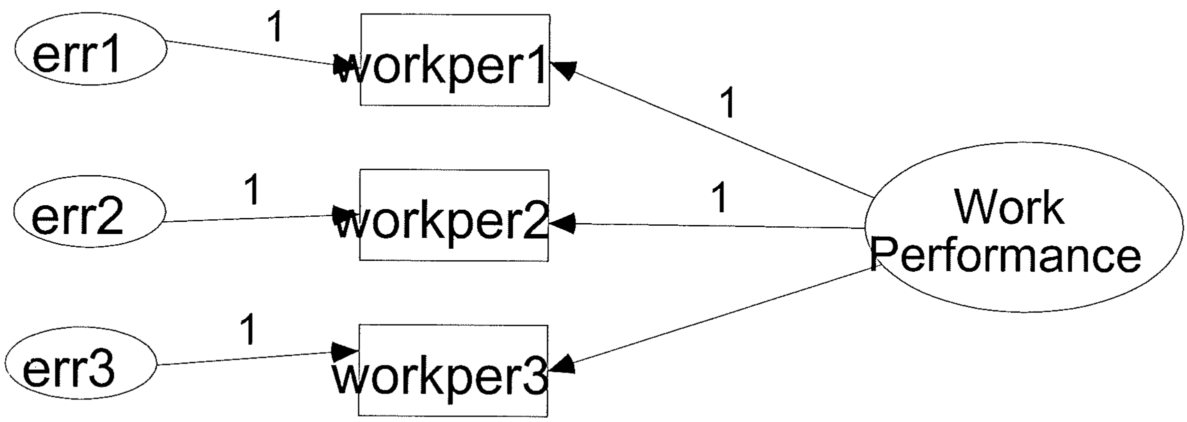
Chi-Square = 2.74 (1 df)
p = .10
GFI = .99
NFI = .99
CFI = .99

Appendix 3.11: Confirmatory Factor Analysis of the Non-Work Control Measurement Model



Chi-Square = 7.6 (1 df)
p = .01
GFI = .99
NFI = .99
CFI = .99

Appendix 3.12: Confirmatory Factor Analysis of the Work Performance Measurement Model



Ch-Square = .47 (1 df)
p = .49
GFI = .99
NFI = .99
CFI = .99